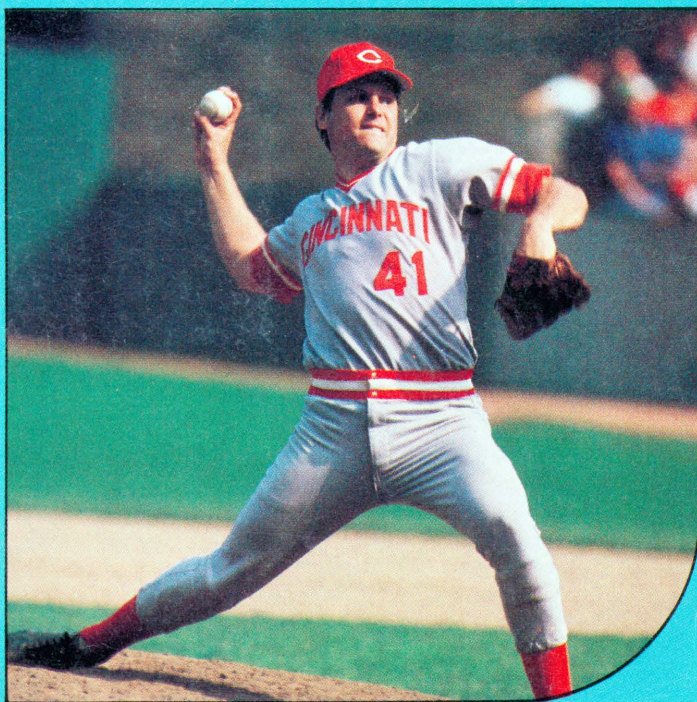
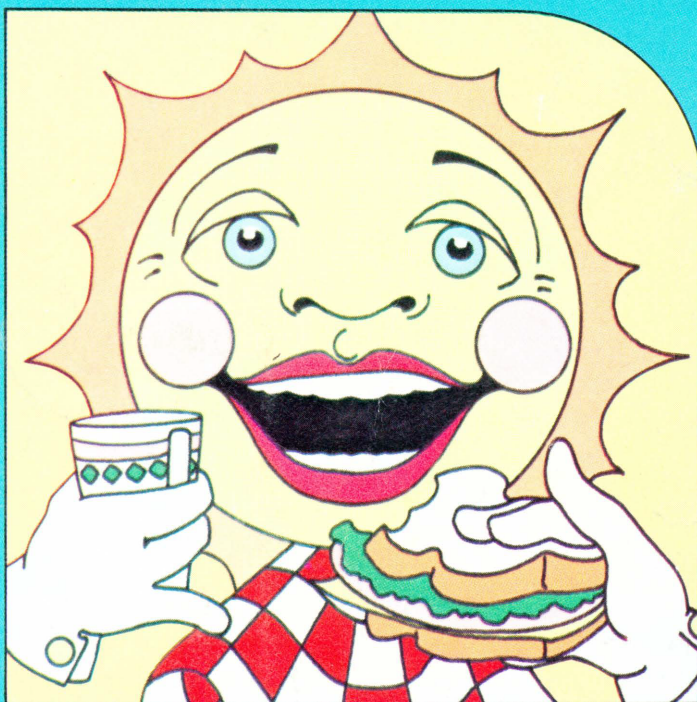
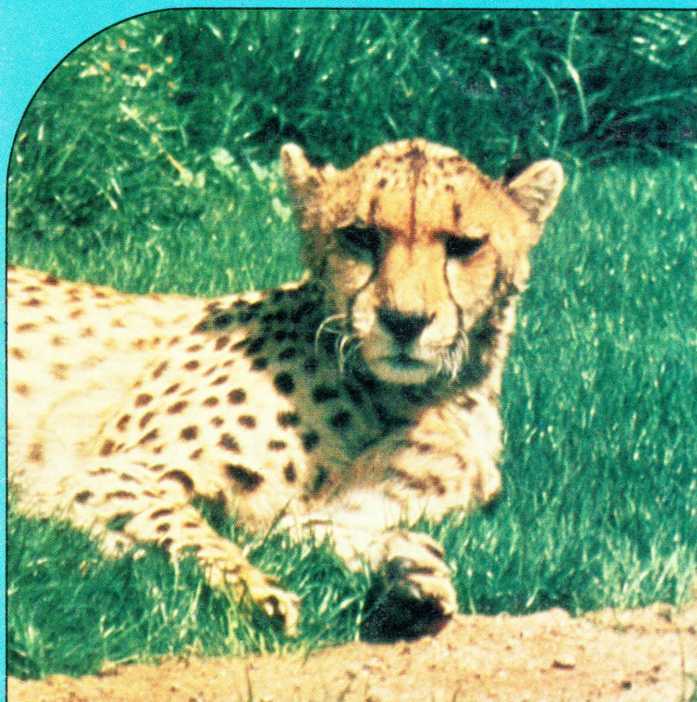


# 321 CONTACT

## New Zoos

### A Plan to Save Wild Animals







Where is this big cat lyin' around? You may think he's on the plains of Africa. But he is really in California.

This lion lives in a special zoo. It has no cages. The animals live in the open, just as they do in the wild! It sounds dangerous, but it's not. To find out more about this unusual zoo, turn to page 14.

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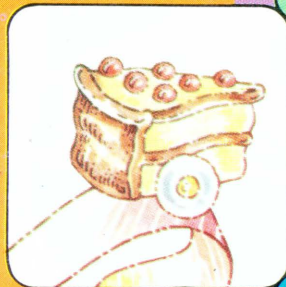
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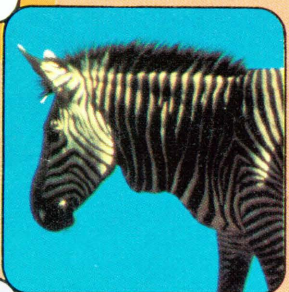
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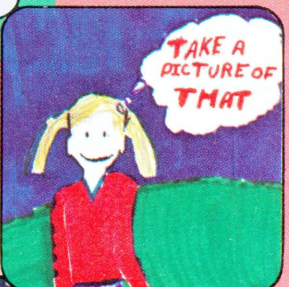
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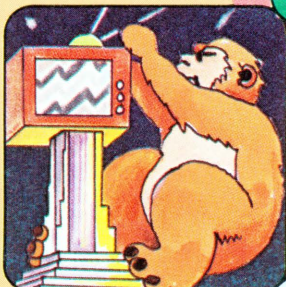
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# 321 CONTACT

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It's baseball season again. Here's your chance to get into the swing of things. On the next two pages are nine questions. Chances are you only know the answer to a couple of them. But when you turn to page 6 and read the answers, you'll be a baseball expert!

**What is a baseball made of?**

**How does a pitcher throw a curveball?**

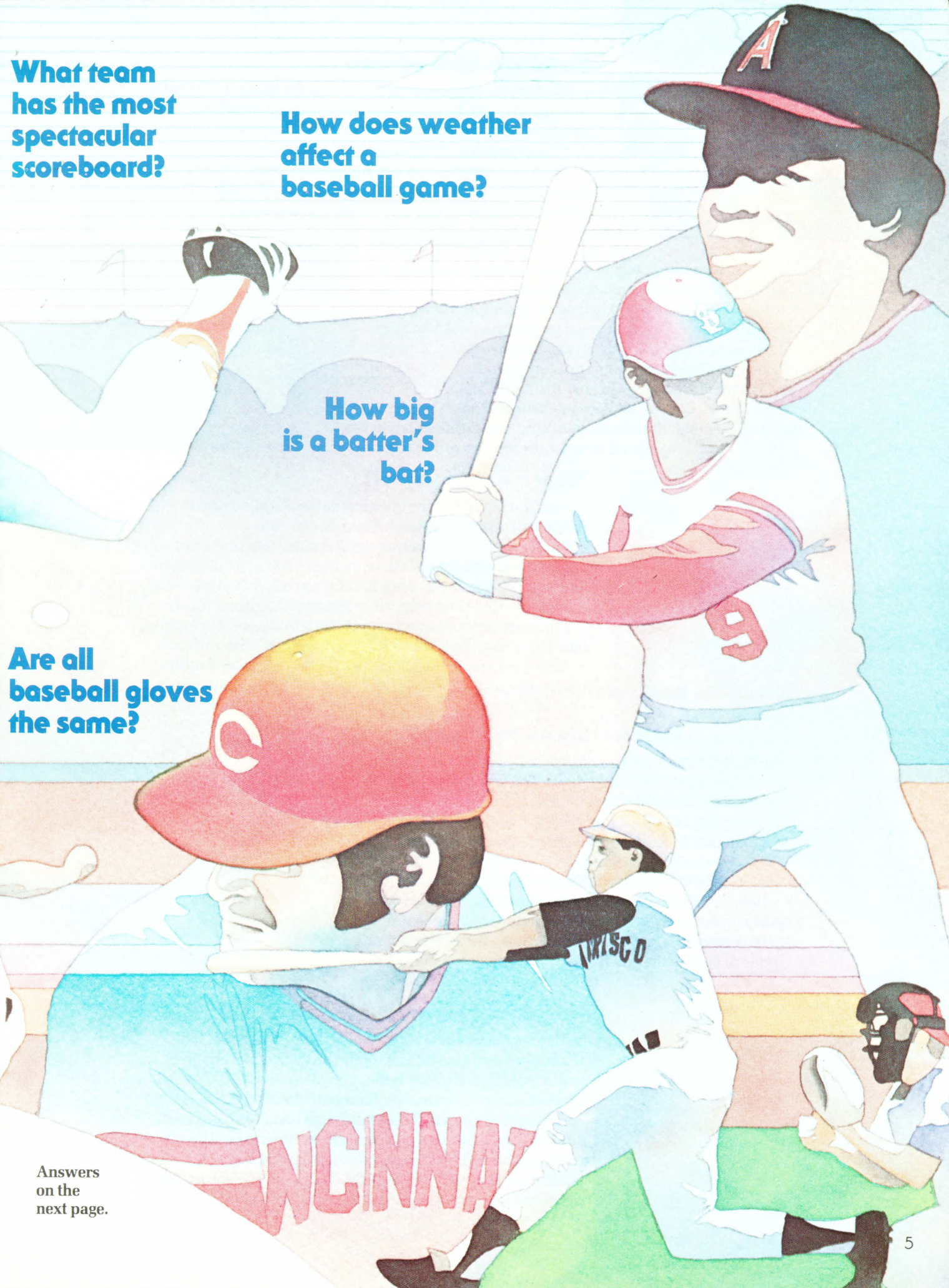
**How fast does a baseball travel?**

**Is this real grass?**

**What is a rosin bag used for?**

*Feil Salomon © 1991*





**What team  
has the most  
spectacular  
scoreboard?**

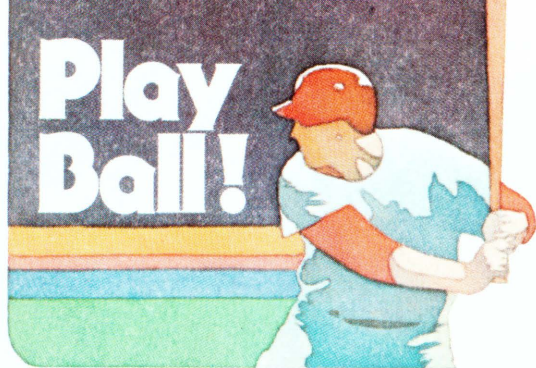
**How does weather  
affect a  
baseball game?**

**How big  
is a batter's  
bat?**

**Are all  
baseball gloves  
the same?**

Answers  
on the  
next page.





## How big is a batter's bat?

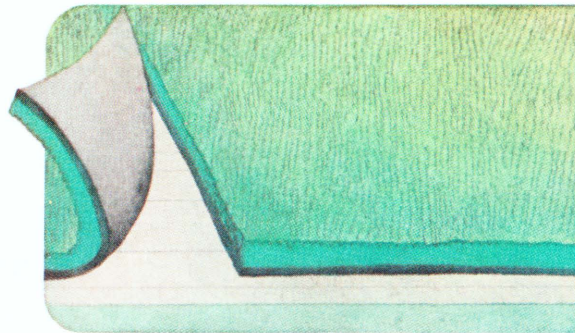
That depends on how big and strong the batter is. The rules say that a bat can be no more than 42 inches (1.1 m) long. But most players stick to one about 35 inches long. That's several inches longer than the average little league bat.

Pro bats are made from ash and hickory trees. Hickory is a little heavier than ash. But both of these woods are just the right strength and weight for pounding baseballs.

## Is this real grass?

That depends on where the game is being played. In the ball parks of nearly half the major league teams, they don't mow the grass. They vacuum it! In these stadiums, the grass fields have been replaced with green carpets that look like grass.

Why use fake grass? It's cheap and easy to care for. The first artificial grass field was in the Houston Astrodome. That field is covered with strips of green carpet 15 feet wide. These strips were first glued to pieces of foam. Then they were put down on the field. Finally, they were zipped together. It took three miles of heavy-duty zippers to do the job.

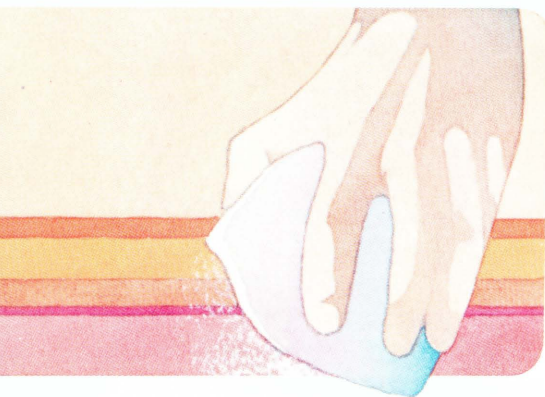


## What is a rosin bag for?

Near the pitcher's mound is a small sack, called a rosin (RAH-zin) bag. What's in it? Rosin, of course!

Rosin is a dry sticky substance. It comes from pine trees and has many different uses. These include making paint, cement and soaps. Pitchers use a bag filled with rosin powder to keep their hands dry. This helps them get a good grip on the ball.

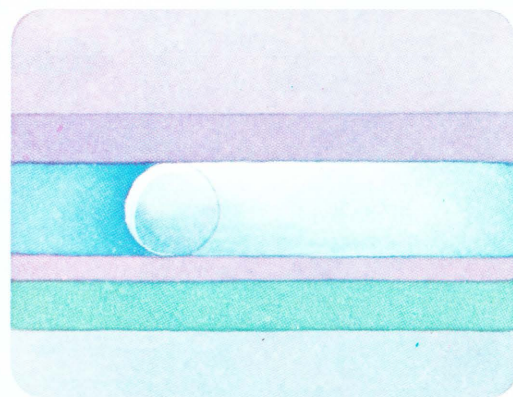
Pine trees produce another substance that is used in baseball. Have you ever noticed that some players' bats are black near the end where they hold them? This means they rubbed the handle with pine tar. This sticky stuff helps a hitter get a hold on the bat. That means he can swing more powerfully.



## How fast does a baseball travel?

A pitcher's fastest pitch is his fastball. Most fastballs travel at about 90 miles per hour. The fastest fastball of all belongs to Nolan Ryan of the Houston Astros. It travels at a sizzling 101 miles per hour. At that speed, a ball takes less than half a second to reach the batter at home plate. No wonder a good fastball is so hard to hit!

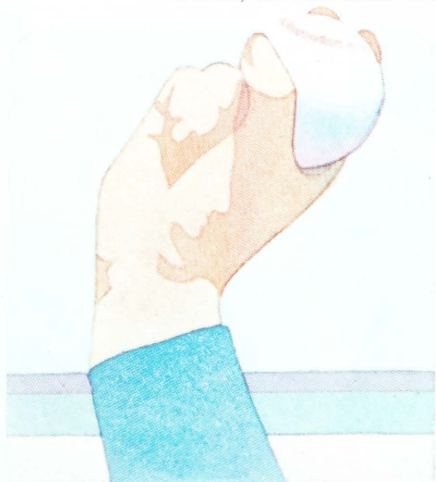
A special machine called a *radar gun* is used to measure just how fast a pitcher throws a baseball. Instead of shooting bullets, this gun shoots invisible microwaves. These waves hit the baseball as it travels towards home plate. The waves bounce back to the gun. By measuring how fast the waves return, the machine can tell how fast the ball is traveling.



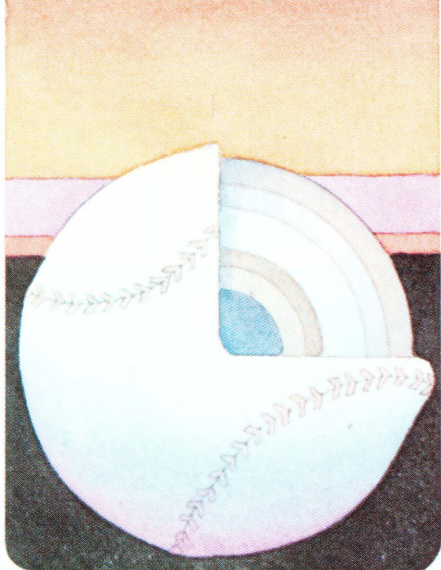
## How does a pitcher throw a curveball?

To throw a curve, a pitcher holds the ball between his thumb and next two fingers. When he brings his arm forward to throw, he lets go of the ball with a sharp twist of the wrist. The ball starts spinning. It's the spin that makes the ball curve.

All baseballs push their way through invisible particles of air. This causes friction and slows them down a bit. When a ball is spinning, the air presses against it unevenly. The ball is pushed slightly to the left or right. That's a curveball. Simple, right? Not if you're trying to hit it!







## What is a baseball made of?

If you could cut one open and peek inside you might be surprised at what you'd find.

After taking off the white leather cover, the first thing you would see is a dried layer of rubber cement. This glue holds the inside of the ball together. Underneath the glue is a ball of cotton and wool yarn. Each baseball has a quarter mile of yarn tightly wound round and round inside it. It might take a while, but if you unwind all that stuff, you'll come to the rubber part of the ball. It's really three thin rubber balls, one inside the other. First there is a black ball, then a red ball, then another black one. Underneath the rubber is the real center of the baseball. It's made of cork.

Each year, professional teams use nearly half a million baseballs. And each one is made the same way.

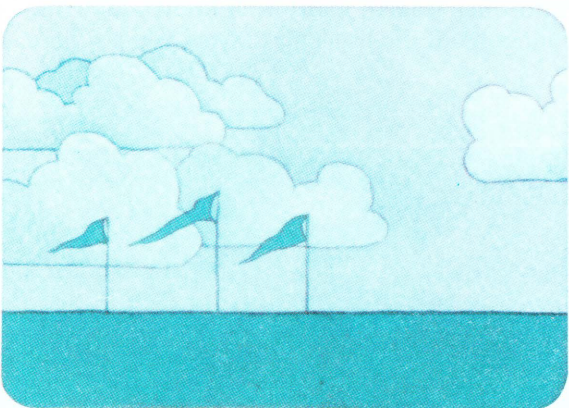
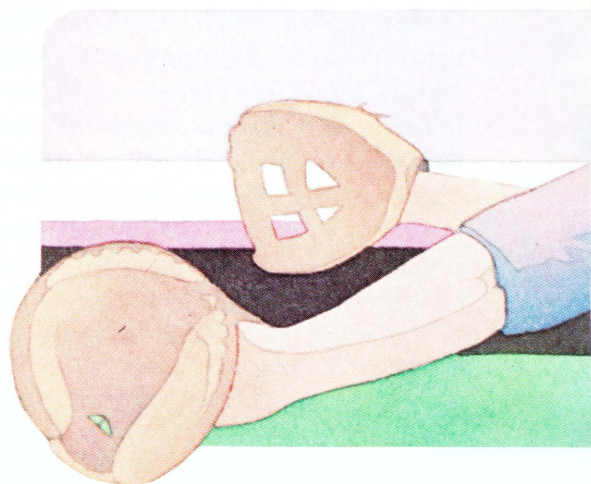
## Are all baseball gloves the same?

Not quite. Most fielders use the the same basic kind of glove.

If you have a glove, it's probably this kind, too. But a couple of baseball players use gloves that are made to suit their special jobs on the field.

A first baseman's glove should really be called a mitten. It has a space for the thumb and one for the rest of the fingers. Catching throws is a first baseman's most important job. So his glove is made to snap shut when a ball goes into it.

A catcher's glove has a place for each finger, as a regular fielder's glove does. But you could never guess from looking at it. The glove is covered with many more layers of thick padding. That makes it possible for a catcher to grab those 100-mile-an-hour fastballs without getting hurt.



## How does weather affect a baseball game?

You know that a heavy rainstorm will keep teams from playing baseball. But weather has a lot to do with baseball even on a bright sunny day. On a hot day, air particles are more spread out. A batted ball can fly more easily through this warm thin air. There are fewer air particles pressing against it, so there is less friction slowing it down.

Atlanta Stadium has some of the thinnest air of any big league park because it is located high above sea level, and the temperature is almost always hot. Home runs soar out of there so quickly that it has been nicknamed "The Launching Pad."

Of course there are other things that affect how far a ball will go. But it doesn't hurt to have some help from the weather.

## What team has the most spectacular scoreboard?

Some teams have scoreboards that shoot off fireworks when a player hits a home run. But the snazziest scoreboard is the one in Dodger Stadium in Los Angeles. Most message boards only work in black and white. The Dodgers' board flashes giant-size pictures in brilliant color.

Instead of light bulbs, the board uses special tubes—37,000 of them. These red, blue and green tubes mix to form color pictures. It's a little like watching a 33-foot-high color TV set. The Dodgers' new board has only been around for about a year.

While waiting for it to be built, the fans were without a message board for half a season. But it was worth the wait!





# BASEBALL BUMPS

When you think of athletes getting hurt, you probably think of bone-crushing sports like football and hockey. But the pros who play any sport, from ping pong to frisbee flying, can get injured. This is because athletes put more stress on their bones and muscles than most people do.

Take baseball. Major league teams play 162 games from April to October. When they aren't playing, the team members are usually practicing. That adds up to six months of running, throwing, jumping and sliding. A few players will suffer serious injuries, such as broken bones. Almost all will have bumps and bruises before the season is over.

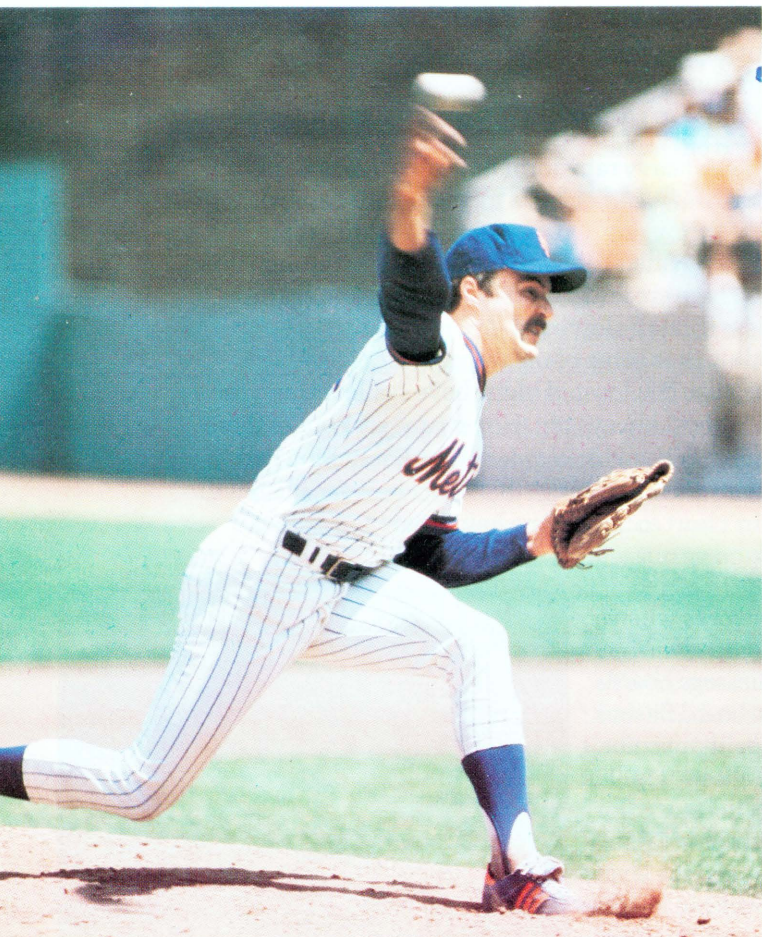
Fortunately, there are people who know how to take care of a player's aches and pains. For small problems, a baseball team's trainer can help. If anything serious happens, the team doctor takes over. They work together to keep everyone healthy.



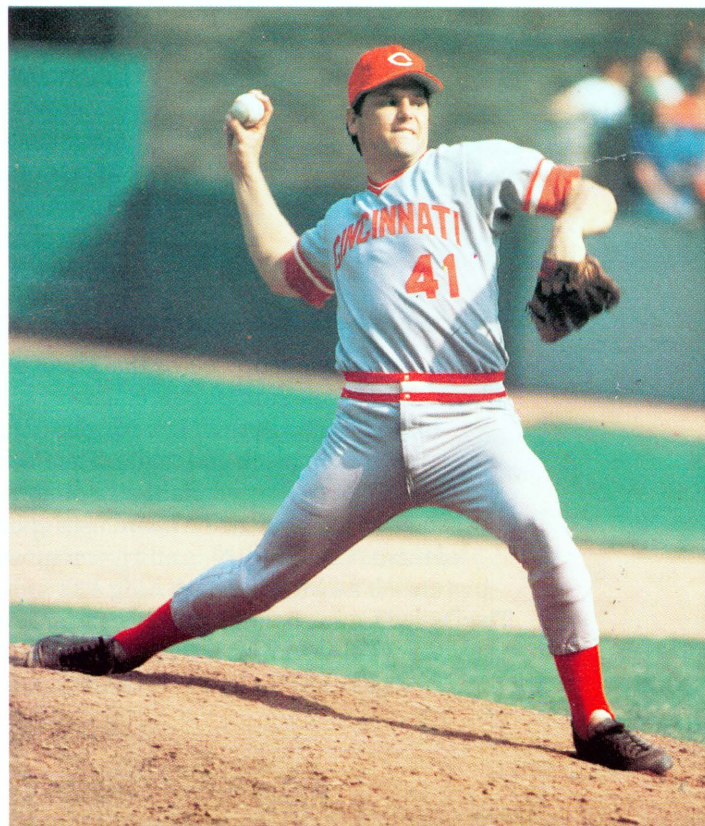
**TIM FOLI**

Dr. James Parkes has treated many well-known athletes. His patients include all the baseball players you see here.

**TOM SEAVER**

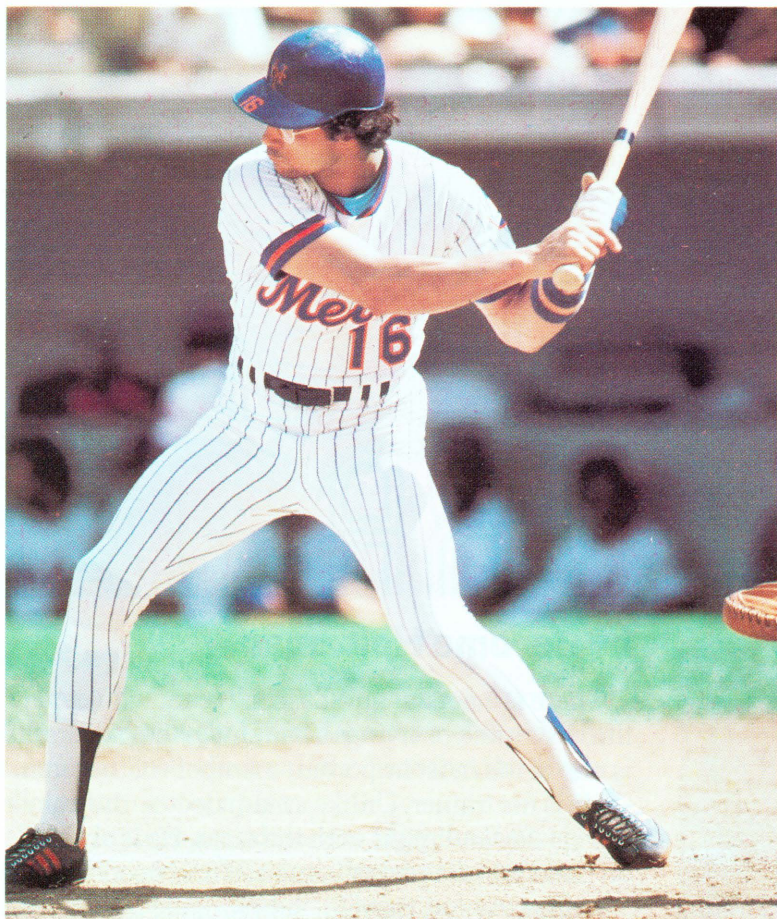


**CRAIG SWAN**





# & BRUISES



LEE MAZZILLI

## SPORTS DOC

by Doug Garr

When James Parkes goes to a baseball game, he has to keep on his toes. He never knows when he will be called on to join the action on the field.

Take one game a few years ago. Catcher Steve Swisher was hit in the throat by a baseball. He lay on the ground in pain, as

Dr. Parkes ran to him.

When Parkes arrived, Swisher had nearly passed out. Parkes thought, "I'm at home plate. What can I do?" The doctor took one look and then went to work. Using his hand, he thumped Swisher a few times on the back. Then he thumped hard on his stomach. In just a few seconds, out of Swisher's mouth popped the chewing tobacco he had accidentally swallowed.

James Parkes is the team doctor for the New York Mets. Most of the problems he treats are more serious than swallowing a lump of chewing tobacco. His specialty is orthopedics (or-tho-PEE-diks). He takes care of old, tired or damaged bones. If a pitcher has a very sore arm, or a batter feels pain when he swings the bat, he calls on Dr. Parkes for help. After seven years with the Mets, he feels like part of the team. "I'm happy to have Joe Torre as a manager," he says. "I have lots of fun and the players like me, so I work harder for them. They've put their total trust in me."

### Broken Noses

Dr. Parkes knows what it is like to get hurt in competition. While studying to be a doctor, he played college football. His nose was broken several times. "We didn't have face masks in those days," he says. "We didn't know they could prevent injuries."

Much of Dr. Parkes's work involves helping athletes before they get hurt. "People's bodies weren't meant to throw a baseball around all day long," he says. "Baseball is a game that wears down your body slowly."

At the end of each season, Parkes writes a letter to each of the New York Mets. In it, he plans their winter training. This includes the best exercise program for each player. Parkes feels that a player who starts a season in the best possible shape can better stand the strain of playing ball.

If a player is more seriously hurt, exercise may not be enough. Dr. Parkes must treat the problem differently. Often ➡

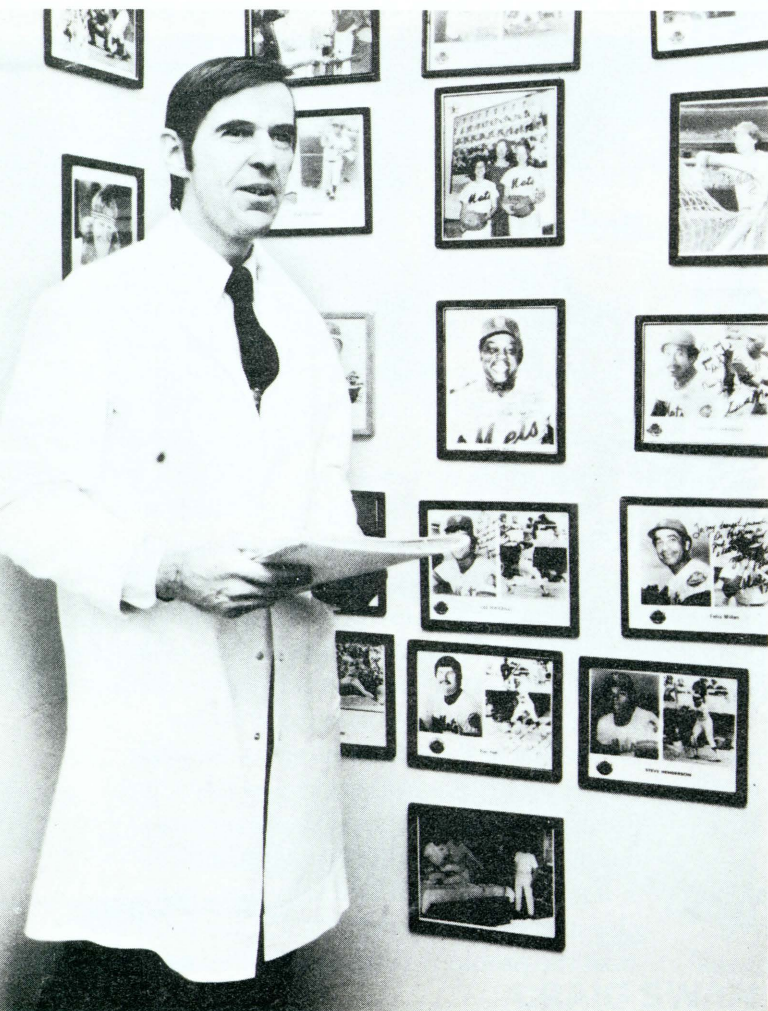


it can mean an operation. One of the most satisfied patients was former Met Bud Harrelson. Six years ago, the doctor examined Bud's knee. It was worn out "really awful," he says. "But of course I didn't tell him that." Dr. Parkes performed an operation to try and get new bone cells to grow. It was a success. Bud went on to play many more seasons.

## Kids' Bones

Not all of Dr. Parkes patients are star athletes. He sees all kinds of people. Many of his patients are kids who injure themselves playing sports. "Children are still growing," he says. "There are areas in their bones that are more sensitive to stress." Because of this, he recommends that young athletes take it easy. Little League pitchers, for example, should not pitch more than a few innings each week. By being careful not to overwork themselves, they can stay healthy. "But the key thing is pain," Parkes says. "If you hurt yourself and you report it right away to a doctor, you probably won't have any serious problems."

**Below:** Dr. Parkes handles all of the medical problems of the New York Mets players. He has been the team doctor for seven years.



# SPORTS TRAINER

by Jerome Holtzman

There is a person on a baseball team who never throws a pitch or swings a bat. But to the players, he is one of the most important members of the team.

He is the trainer. Unlike a team doctor, the trainer travels day and night with the team. He is always on hand when a player is injured and needs help.

In many ways, Herman Schneider of the Chicago White Sox is a typical trainer. He is 29 years old. He has a friendly personality. And he has been involved in sports all his life. "When I was 11 years old, I was already hanging around ball parks," he says.

When he was young, Herman played on his school's sports team. Herman knew he wasn't good enough to play in the pros. But he wanted to stay active in sports. So he became the clubhouse boy for a minor league baseball team—the Rochester Red Wings. His job included doing just about everything around the clubhouse. He swept the floor, washed the players' uniforms and shined their shoes.

After two years, the Baltimore Orioles offered Herman a chance to work as an assistant trainer in the minor leagues. From that time on, Herman's career was a lot like a young baseball player's. He worked his way through the minor leagues, learning more and more as he went. Four years ago, he became assistant trainer for the New York Yankees. Then last year, he joined the Chicago White Sox as their trainer.





**Left:** Trainers handle a player's minor medical problems. Here Herman Schneider works with former Chicago White Sox pitcher Ken Kravec.

**Below:** Kravec in action.

## Working with Doctors

The trainer must work closely with the doctor. If a player is seriously injured, a doctor will plan the treatment. The trainer will then see that the player follows the doctor's plan.

Some injuries are taken care of by the trainer alone. "We can handle and diagnose the minor problems," Schneider says. These include pulled muscles and sprained ankles and fingers. Schneider uses ice and heat to help heal aching muscles. Sometimes he massages the muscles and wraps them with tape. Often a player can then play without getting injured again.

Schneider learned to be a trainer by watching other trainers work. But, even though he is now in charge, he is still learning. People are discovering more and more about sports medicine. So there is always more to learn. Three or four times a year, Herman attends special meetings. There he learns the newest treatments for injured players.

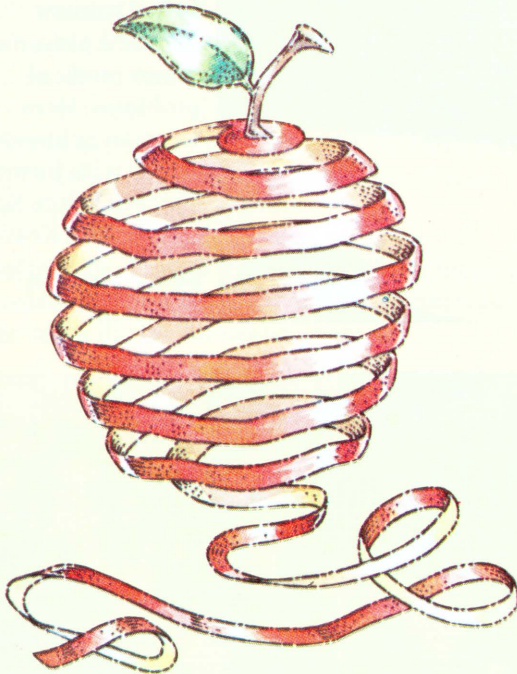
Being a trainer has many rewards. The moment Herman likes best is when a player who was injured returns to the lineup. "When a player is hurt," he says, "the first thing that comes to mind is that this injury might be the end of his career." That's when Herman goes to work, making sure a player can be healthy and bounce back as soon as possible. The players appreciate his concern for them. "Herman is like a brother," says Ken Kravec. "He really cares."





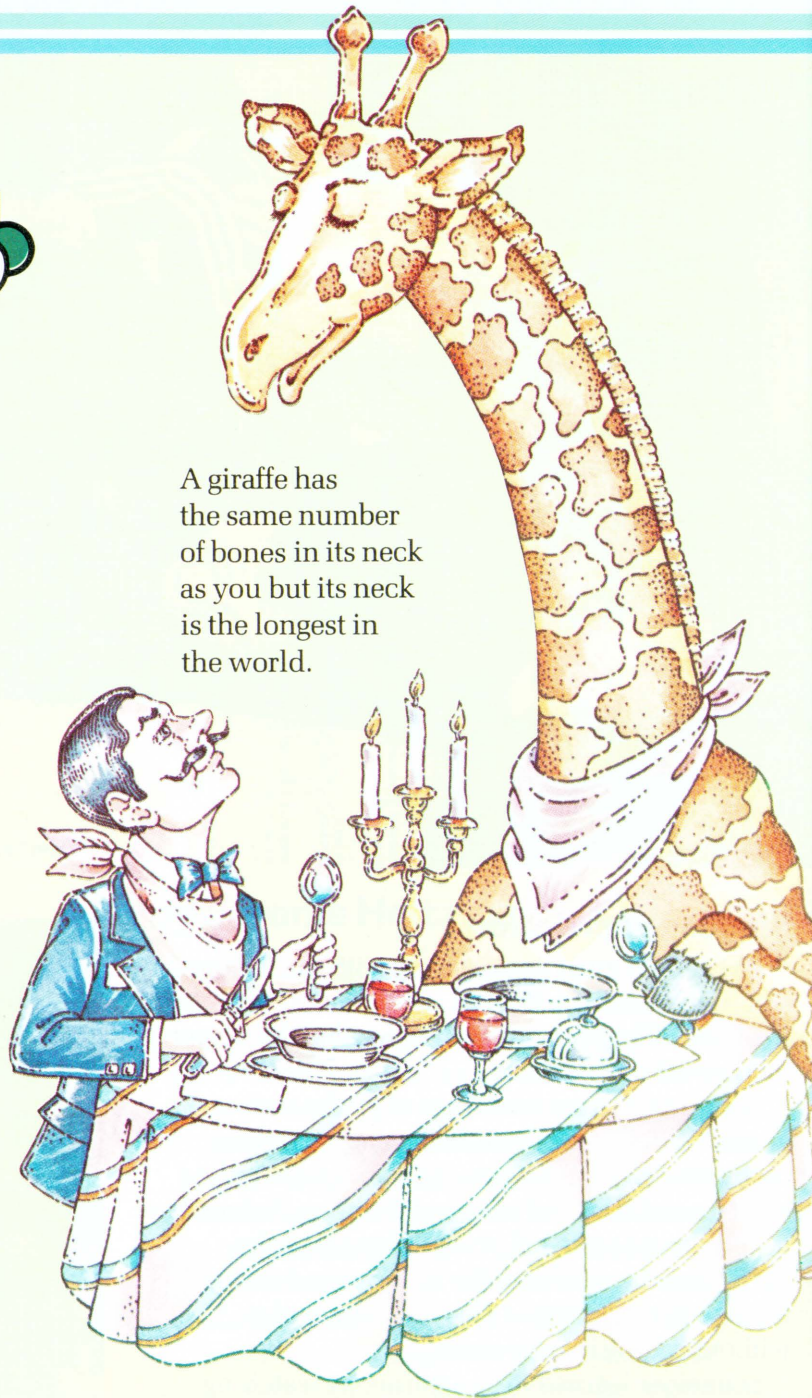
# Factoids

What are factoids? They are weird little facts that are stranger than strange, truer than true. Use them to wow your friends, amaze your family and dazzle your teachers.

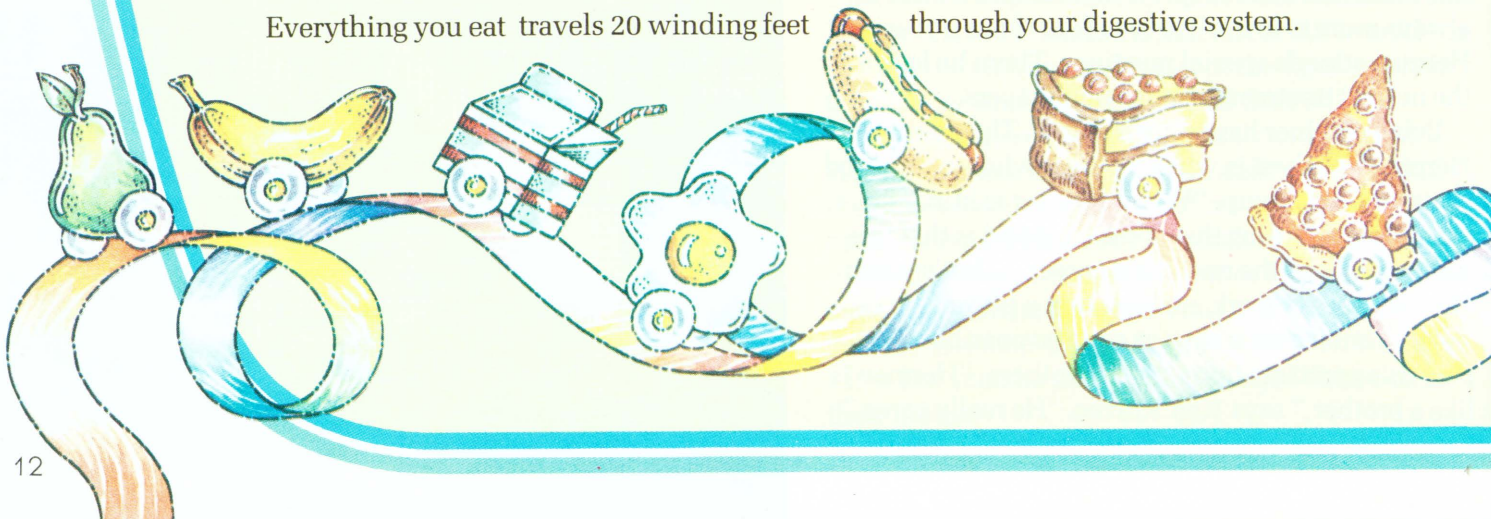


Kathy Waffler, age 16, peeled the longest single apple peel. It stretched 155 feet.

A giraffe has the same number of bones in its neck as you but its neck is the longest in the world.

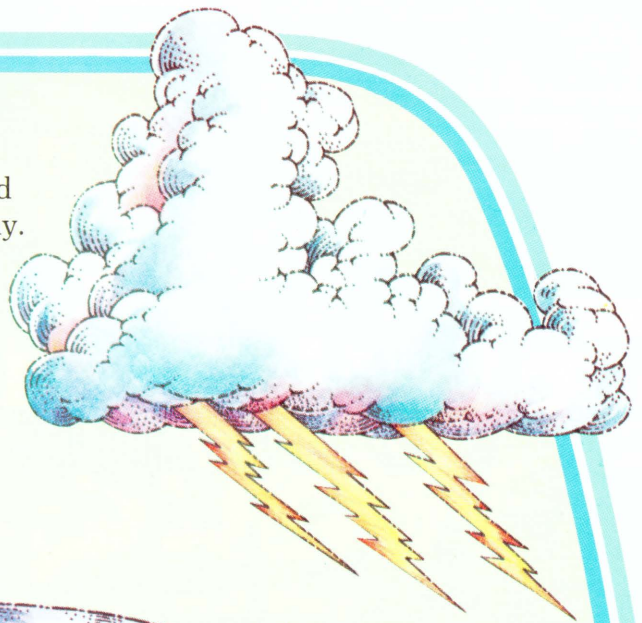


Everything you eat travels 20 winding feet through your digestive system.

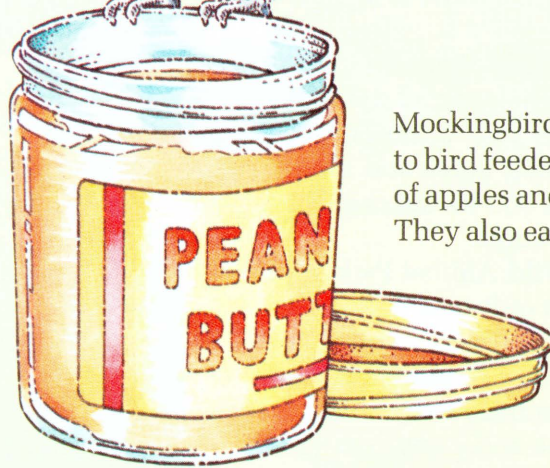
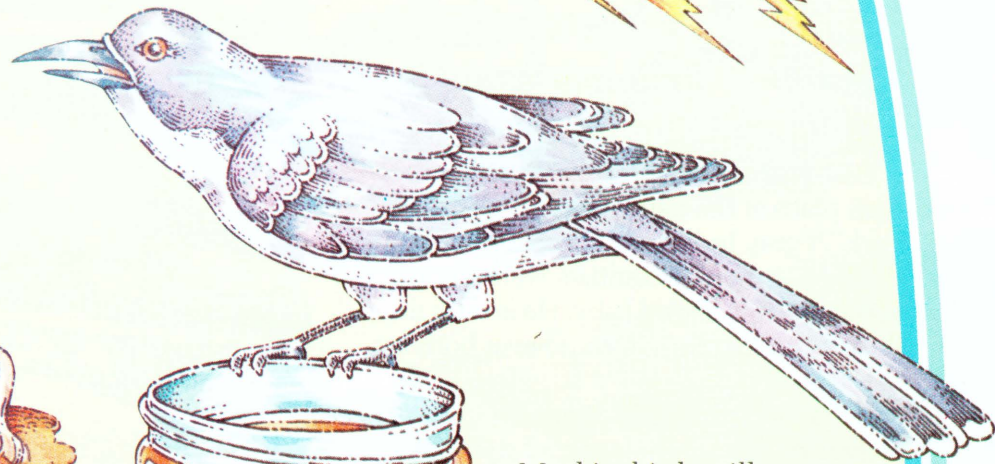




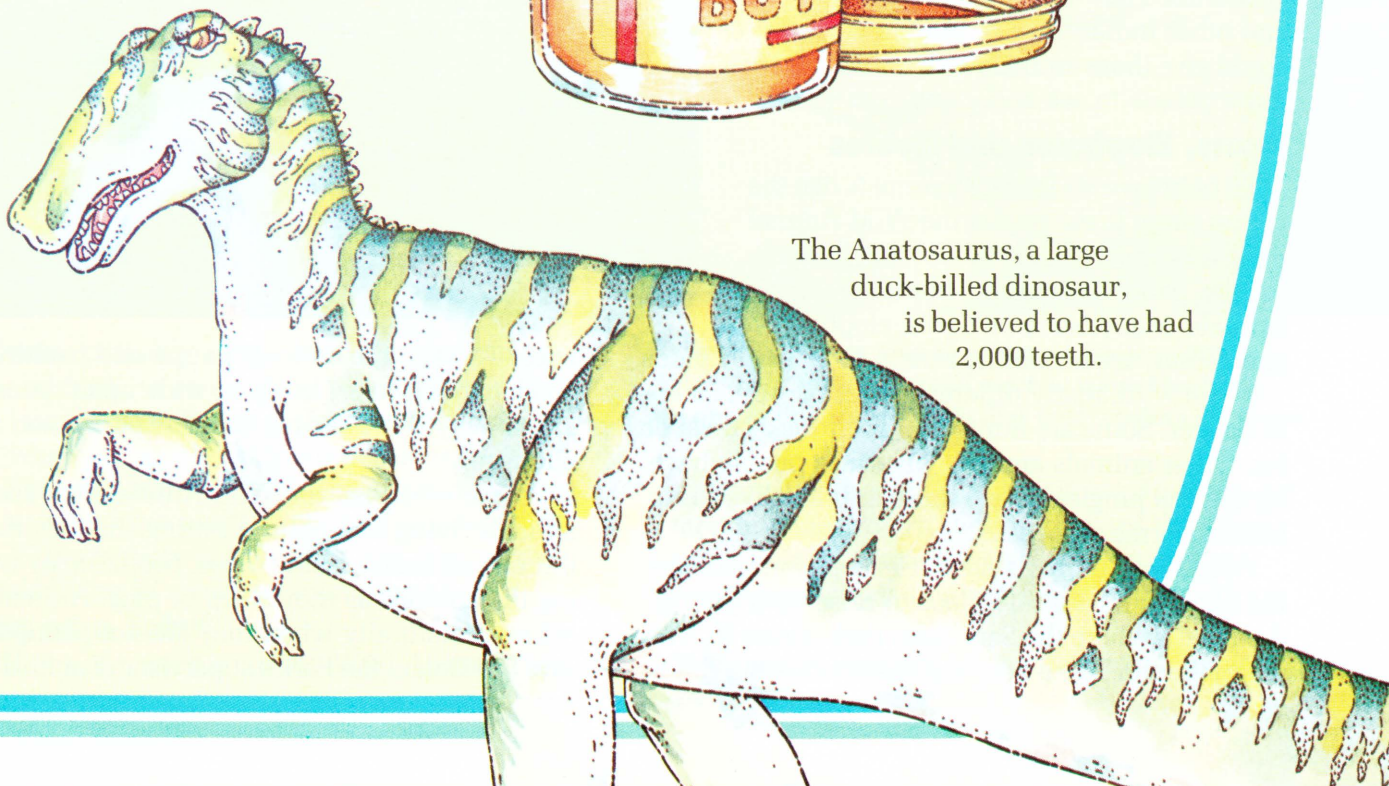
Thunder can be heard  
as far as 18 miles away.



A bristlecone pine tree is the oldest  
living tree — it's 4,600 years old.



Mockingbirds will come  
to bird feeders for slices  
of apples and oranges.  
They also eat peanut butter.



The Anatosaurus, a large  
duck-billed dinosaur,  
is believed to have had  
2,000 teeth.



# ZOO WITHOUT CAGES

by Diane Gage

Last year a rare and important birth took place at the San Diego Wild Animal Park. A gray Indian rhinoceros named Pandu was born. Scientists were excited about the 100-pound baby. He is only the third surviving Indian rhino ever born in this country.

Pandu's birth is important because Indian rhinos are in danger of dying out. For centuries these huge animals have been hunted for their horns and skin. Today, only about 900 Indian rhinos are left in the whole world.

People at the Wild Animal Park hope they can take care of Pandu until he grows up. They would like to raise several other Indian rhinos, too. Then they could give these animals away to zoos for more people to see and enjoy.

## **Tigers, Elephants and Zebras**

To help save endangered animals like the Indian rhino is the reason the Wild Animal Park was built. Nine years after it opened, the park has become home for 3,200 animals. Many, such as tigers, elephants and zebras, are becoming rare in their native lands.

In the wild, many different kinds of animals are in danger. Some are hunted for their tusks, meat or fur. Other animals are dying because people have turned the jungles where these animals lived into houses, farms and roads.

What these animals need, to keep from vanishing altogether, is a safe place to raise their young. And that's where the San Diego Park comes in. The park is much like a zoo. But there's one big differ-

ence. To keep the animals happy and healthy, the zoo lets them roam freely in wide open spaces. That's why some people call this park a zoo without cages.

People who visit the Wild Animal Park see animals living in a natural setting. As they ride through on small electric trains, people enjoy watching the animals as they sleep or play. Animals act more naturally when they are not penned in, says Jim Dolan, the Park's supervisor of animal care.







"You've probably seen a bear in a zoo pacing back and forth, or an elephant rocking from side to side," explains Dr. Dolan. "An animal acts this way only when it is confined to a small area."

In the park, many animals share the open areas. "We usually have herds of 40 to 50 animals," he says. "This is more natural than just one or two animals living in a cage by themselves."

### **Going on a Safari**

Millions of people go to the Wild Animal Park

**Above:** Elephants play near a pool while people watch them from the small electric train. Elephants are one of the first animals that park visitors get to see.

each year. You might enjoy a visit, too. Imagine, for a moment, that you're stepping aboard the small electric train. It's time for a safari through the swamps and forests that represent areas of Africa and Asia.

Soon you're crossing grassy plains that look ➡➡





**Above:** Giraffes, an ostrich and several zebras enjoy a sunny day on the grassy plains. They all live peacefully together.

like East Africa. Watch the elephants bathing in the pond. They're using their trunks to spray water on themselves and the grass around them. The plants here, and in other sections, are chosen to make the animals' living space as homelike as possible.

Next, your train crosses into the area where lions and tigers live. Each section is set off from the others by wide deep ditches or an occasional fence. What if a tiger suddenly leaps out of hiding? Don't worry—you're safe. The train goes up to a higher level so the big cats can never get too close to you.

Soon the scene changes to a sandy desert. Antelopes with long horns are grazing peacefully. They are called Arabian oryx. These gentle brown and white animals are among the rarest creatures in the world.

The Asian bush section is especially exciting. Several giant forest dwellers live here. It's hard to believe that the gaurs, or wild cattle, are really gentle. They stand six feet tall and weigh as much as 2,000 pounds.

## Caring for the Animals

Taking care of all these animals is a big job. When they get sick, two veterinarians take over. They also help if animal mothers have trouble giving birth to their babies. In their daily work, the vets are helped by a team of 10 keepers who watch the animals and feed them. They ride through the fields each day in pickup trucks.

"If an animal hangs back from the herd or staggers while walking, we know it is not feeling well," says Larry Killmar, a field supervisor. "The vets will watch the animal and care for it if it doesn't get better on its own."

Each morning the keepers load their trucks with feed. The gaurs, oryx and other hoofed animals eat about 2,000 pounds of hay and barley a day. The birds want seed, while the apes prefer fruit.

Taking care of the animals every day is fun for the zoo workers. But even more exciting is knowing that they're helping to save whole groups of animals for the future.

## Real Life Savers

The Wild Animal Park is quite different from the first zoos. About 150 years ago, many early zoos



were small, dirty and crowded. Lots of their animals did not live long. This meant that zoos had to keep buying more animals to replace the ones which died. And hunters had to go on capturing more wild animals to meet the needs of zoos. Instead of helping, some zoos were making the animals' problems worse.

About 30 years ago, biologists decided that new kinds of zoos were needed. Soon scientists at the famous San Diego Zoo decided to build a big zoo park. It was important to set aside a large space, they knew. Some animals, such as cheetahs, can't raise babies when they're too crowded.

When the 1,800-acre Wild Animal Park opened, it became the first zoo without cages in the country. Now it's no longer the only one. But it is still the only zoo that was built just to protect the future of wild animals.

For people, this wild animal park is exciting. They get an unusual chance to see rare animals in a setting much like the animals' natural homes. But for animals such as Pandu, the Indian rhino, this park offers more than just an adventure. It's a real life saver!



**Above:** Antelopes graze on fresh green grass. These are one of seven different kinds of antelopes that live in the park. All are large heavy animals with long straight horns. The rarest kind is the Arabian oryx. The park sends some oryx back to live in the Middle East.



**Above:** A zebra mother and her colt romp along the hillside. In Africa, zebras are one of many animals that are becoming rare.

**Left:** It's chow time for the hungry rhinos. They're glad to see the zoo workers unloading sacks of barley and hay to feed them.



# Any Questions?

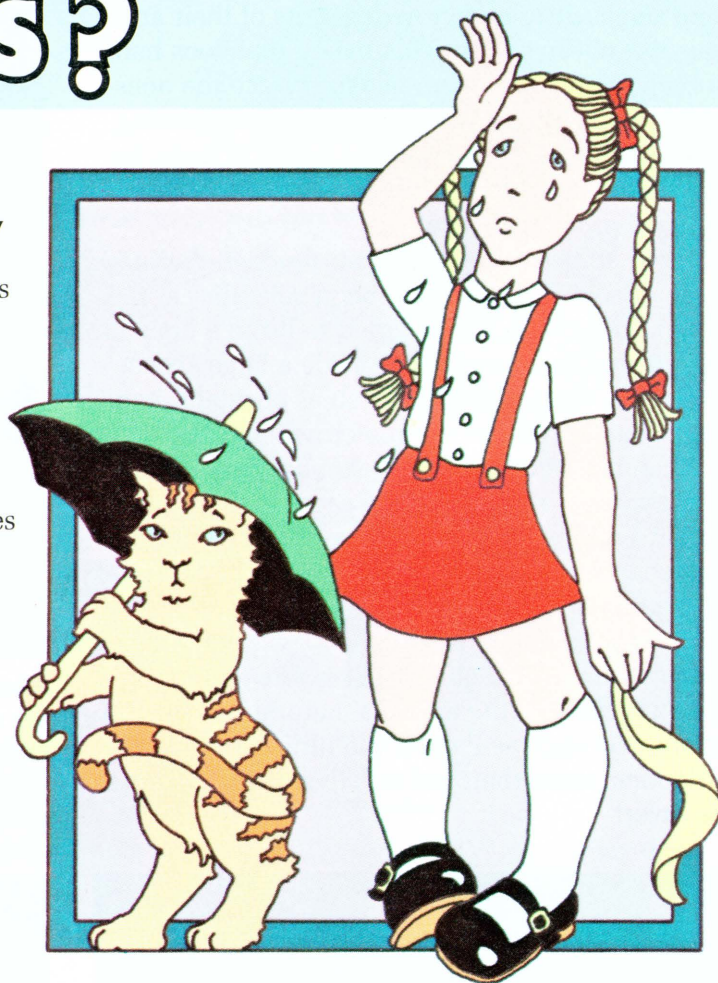
## Why do people cry when they are sad?

Tears are one way your body protects itself. When a speck of dirt or an eyelash gets in your eye, tears wash it away. Many animals cry for this reason, too. But that doesn't explain why you cry when you're sad.

Tears of sadness may be caused by your muscles. When you feel very unhappy the muscles around your tear glands tighten up. This tightening squeezes out some of the liquid there, and a tear drops out. This kind of crying may also happen if you laugh very hard.

A scientist in Minnesota named William Frey thinks tears of sadness may also be helping your body. He says these tears may be getting rid of chemicals your body wishes to remove. These chemicals, he guesses, could be part of the reason you feel sad. To check his idea, Dr. Frey is now studying the differences between tears caused by peeling onions and tears caused by feeling sad.

Question sent in by Jennifer Homes, South China, ME.



## What holds islands up?

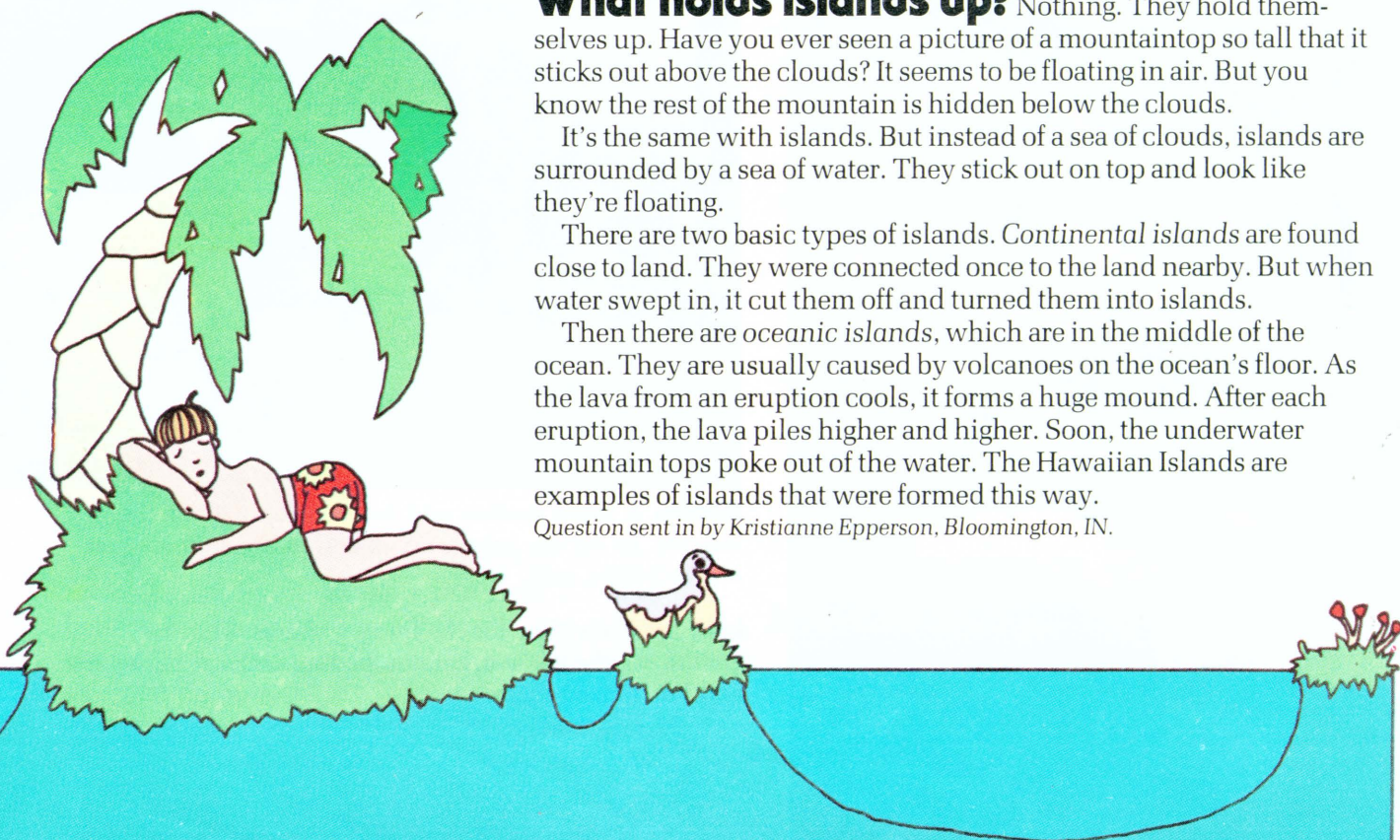
Nothing. They hold themselves up. Have you ever seen a mountaintop so tall that it sticks out above the clouds? It seems to be floating in air. But you know the rest of the mountain is hidden below the clouds.

It's the same with islands. But instead of a sea of clouds, islands are surrounded by a sea of water. They stick out on top and look like they're floating.

There are two basic types of islands. *Continental islands* are found close to land. They were connected once to the land nearby. But when water swept in, it cut them off and turned them into islands.

Then there are *oceanic islands*, which are in the middle of the ocean. They are usually caused by volcanoes on the ocean's floor. As the lava from an eruption cools, it forms a huge mound. After each eruption, the lava piles higher and higher. Soon, the underwater mountain tops poke out of the water. The Hawaiian Islands are examples of islands that were formed this way.

Question sent in by Kristianne Epperson, Bloomington, IN.





Do you have a question that no one seems able to answer? Why not ask us? Send your question, along with your name, address, and age, to:

**Any Questions?**  
**3-2-1 CONTACT**  
P.O. Box 599  
Ridgefield, NJ 07657

## Why does a mosquito bite itch?

Before answering that question, here's a little good news. You only have to worry about half the mosquitoes in the world biting you. It's true. Only female mosquitoes bite—males don't. The females need the blood to help develop the eggs inside their bodies.

A mosquito pokes through your skin with six straw-like parts of her mouth, called *stylets*. Since blood thickens very quickly, the mosquito needs a way to keep it moving. So she injects saliva into the tiny wound. It thins the blood and makes it easy for her to sip it out.

Unfortunately, most people are allergic to that saliva. Your skin swells up and you can't stop scratching. It's enough to drive you buggy.

Question sent in by Sharon Midler, East Brunswick, NJ.



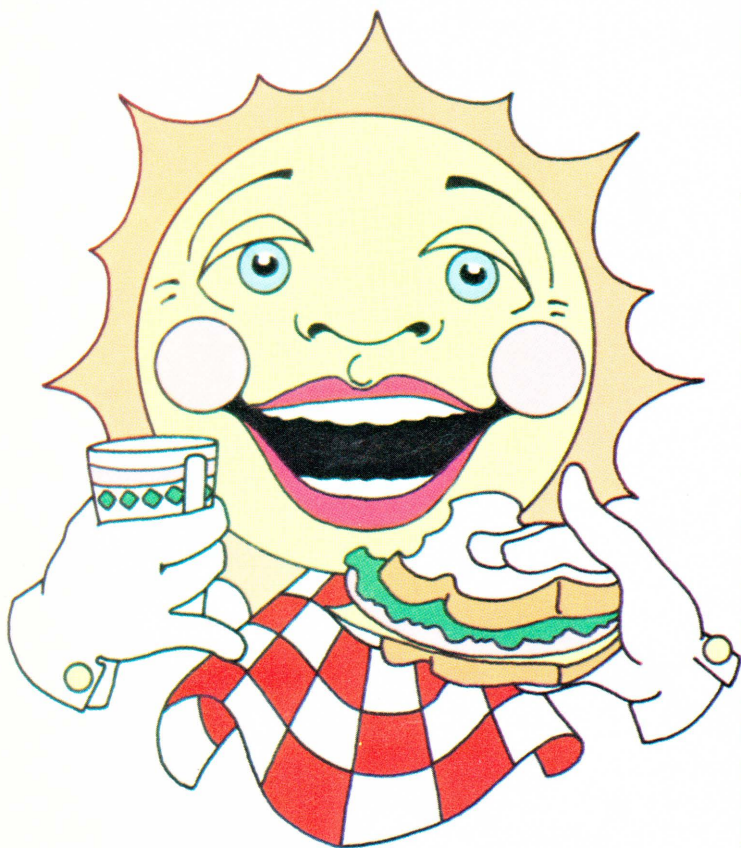
## Why is the time different in different states?

The position of the sun in the sky lets you know what time it is. Since the sun can't be at the same place in the sky everywhere at once, as the earth spins, time changes.

Long ago, each country had its own time system. That got confusing. So in 1883 Standard Time was created. In Standard Time, the world is split into 24 time zones. Down the center of each runs a make-believe line called the *standard meridian*. With it, you can figure out the time for each city, state or country in its zone. When the sun is directly overhead at a meridian, it's noon in that zone.

Going west, it gets one hour earlier for each zone you cross. That means when someone is eating lunch at noon in New York, kids are just getting to school in Los Angeles, where it's three hours earlier. In Honolulu, Hawaii, halfway across the ocean, it's just seven o'clock in the morning and they are just getting up!

Question sent in by Jackie Gaddis, Oakland, CA.





# STAR WHEEL

## A Map of the Stars

Stargazing can be fun, if you know what you are looking at. But it's hard to tell one star from another on a clear starry night. What you need is a star wheel.

A star wheel is a kind of map of the night sky. You can use it to pick out stars. You can also spot constellations—imaginary pictures formed by the stars. Best of all, you can use your star wheel all year 'round. As the seasons change and the stars in the sky move, your star





wheel moves right along with them!

Use the circle and square below to make a star wheel. Outside on a clear night, you can use it to spot stars and constellations.

Making a star map takes lots of work, but it's worth the effort. If you can, get help on the steps marked with a star.

**What You Need:** cardboard to cover both the circle and the square (oaktag or thin

poster cardboard), pencil, stapler, glue, scissors, paper fastener, paper clips.

## Getting Started

**1.** Cut out the circle. Then cut out the square.

**2.** Trace the circle on the poster cardboard. Trace the square next to it. Cut out these two shapes. Now you're ready to put your star wheel together. To find out how, turn to page 34.





# Timeline



This ancient Greek windmill used sails to catch the wind.

## The History of Windmills

by Douglas Colligan

### Past

Long before there were electric power plants or gasoline engines, people used the wind to help them work. The first windmills were made in Asia over 1,300 years ago. People put wooden planks on the tops of buildings. When the wind blew, the planks turned. That turning helped move a heavy stone inside the building. The stone crushed wheat and made it into flour. The flour was then made into bread.

Travelers from Europe saw these windmills. They brought this idea for using wind power back home with

them. Soon windmills in Europe were grinding grain, running saws and pumping water.

When you say “windmills” most people think of Holland. There, windmills have the very important job of pumping water. Much of the country used to be swampland. Thousands of windmills were used to drain the land and keep it from flooding.

Windmills also helped tame the wild west. In the 1850s, American Daniel Halliday invented an easy-to-build windmill kit. Cowboys could load it onto wagons and take it with them. Halliday’s kit was a tower with a metal pinwheel at the top. This windmill pumped up water from deep in the ground. It gave cowboys and their cattle something to drink on a hot dry prairie. Daniel’s windmill is still used in some parts of the U.S.



## Present

When electricity was discovered in the 1800s, wind power became less important. After all, machines which worked on electricity could pump water and make flour easily. Why bother with wind power and windmills?

But, to produce electricity, oil had to be used. In recent years, oil has become very expensive. Wind doesn't cost a penny. So now people all over the world are thinking about using windmills again. These windmills don't replace electricity. They produce it.

There are already a few windmills that make electricity from windpower. Small windmills make enough

electricity to power a person's house. A few bigger ones are now making enough electricity for a neighborhood. Some of these new windmills look like giant pinwheels. Others look like paddlewheels lying on their sides. Some even look like upside-down eggbeaters.

One of the world's biggest windmills is on a mountaintop near the town of Boone, North Carolina. The windmill has two huge blades, each 100 feet long. This windmill can make enough electricity for a town of 10,000 people!

# Timeline



This giant windmill produces electricity for 10,000 people.

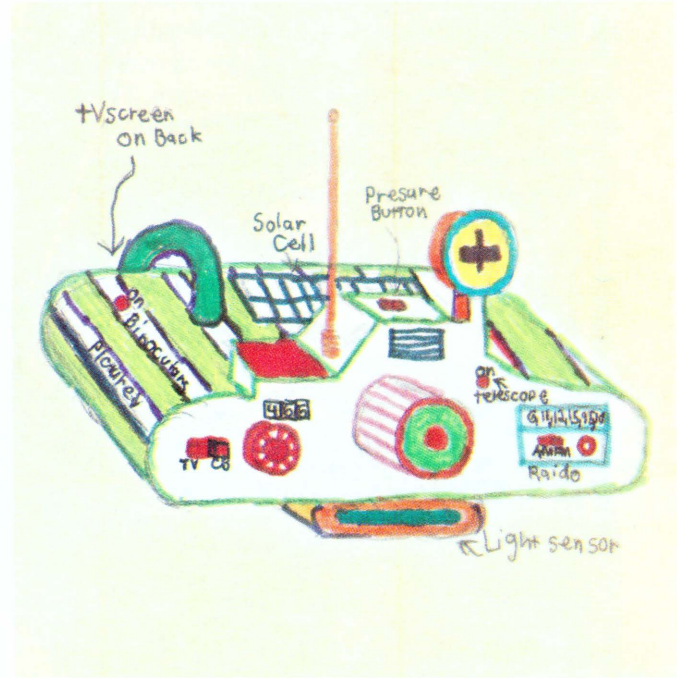


# MAIL

**Future Cameras** Thanks for sending in all those great drawings to Timeline. Here are a few of our favorites:



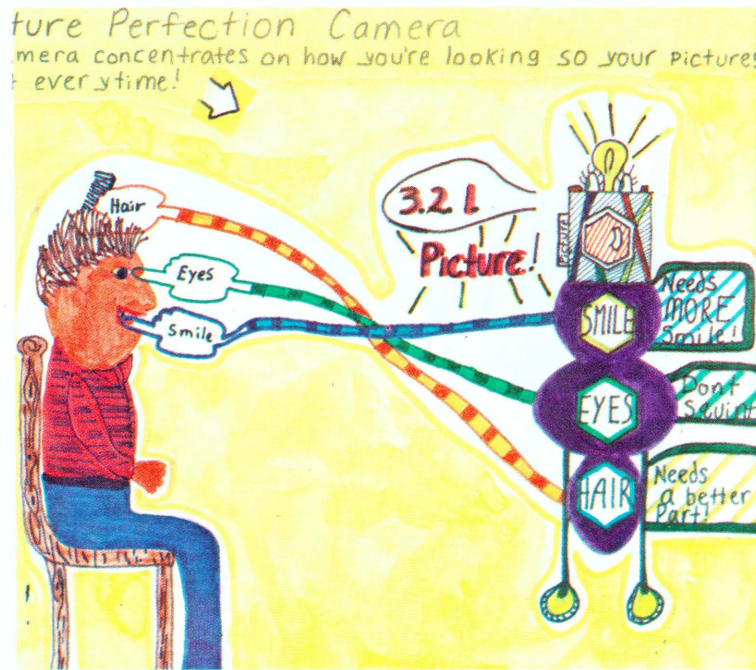
**Amy Halin**, Indiana, PA. Amy's camera walks, skis, skates and flies.



**Gerald Stevens**, Livermore, CA. Gerald's solar powered camera has a TV screen on the back.

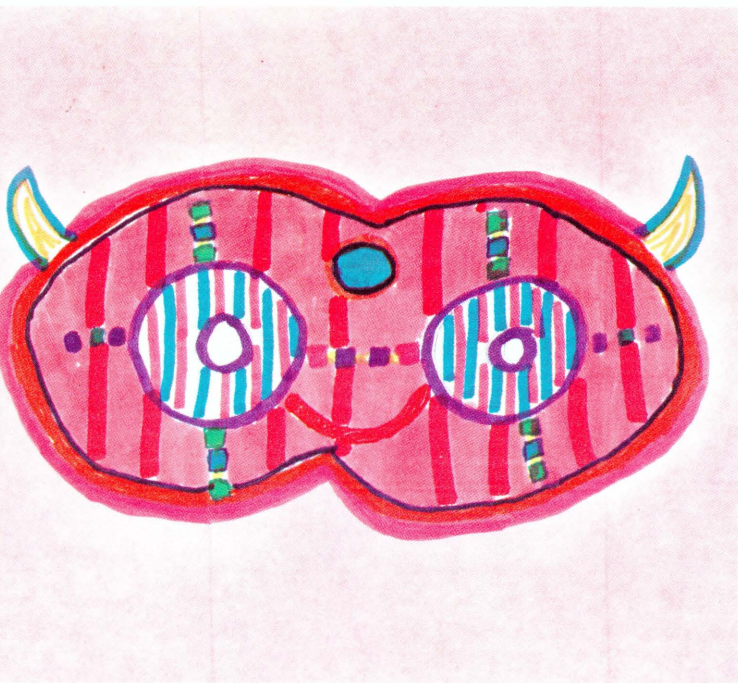


**Mike Knight**, Jacksonville, FL. Mike's camera has jet engines to hold it up while it takes your picture.



**Jeff Johnson**, Leawood, KS. Before it takes your picture, the Picture Perfection Camera makes sure you look just right.

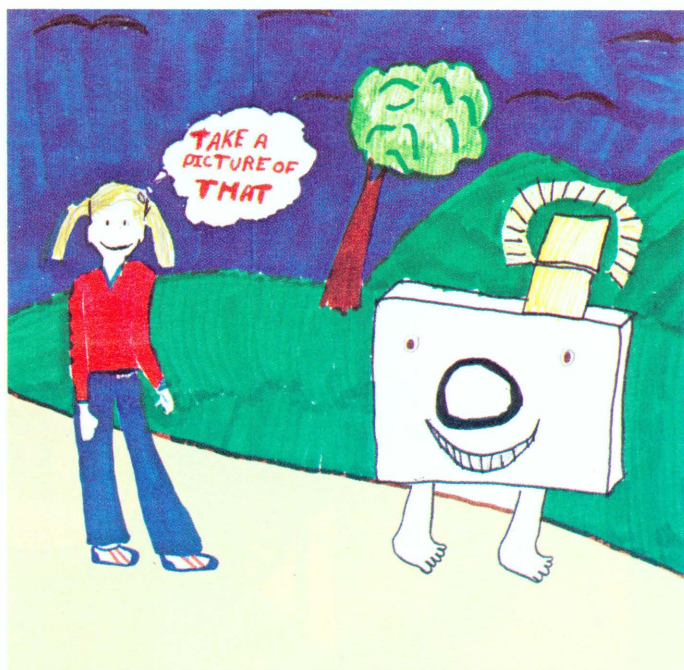




**Kristin Maniccia**, Indiana, PA. If you press the blue button on Kristin's camera, it will do anything you would like.



**Jennifer Prewitt**, Hudson, IL. These glasses are really a camera!



**Jamie Walker**, Camarillo, CA. How about a camera that reads minds? This one will take a picture of what you're thinking about.

## Timeline

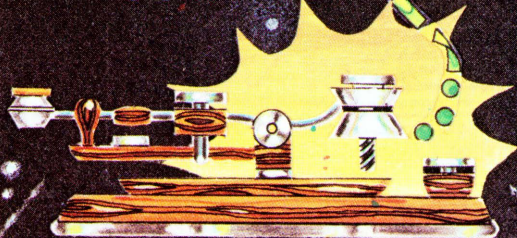
### Send Us Your Future Windmills

We just told you about the windmills of the past and present. Now, show us your windmill of the future. Will there be "windmill parks" where hundreds of windmills make electricity for whole cities? Maybe people will live in windmill houses. Draw your future windmill and tell us what it does. Our favorites will get a T-shirt. Send your name, address, T-shirt size and windmill to:

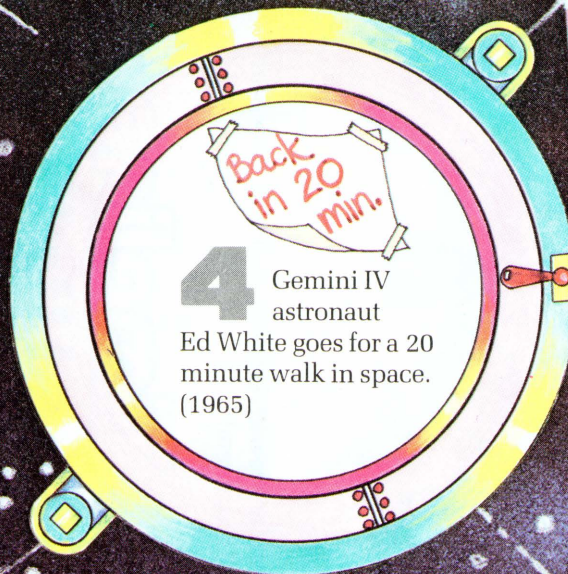
**Timeline: Windmills**  
**3-2-1 CONTACT**  
**P.O. Box 599**  
**Ridgefield, NJ 07657**



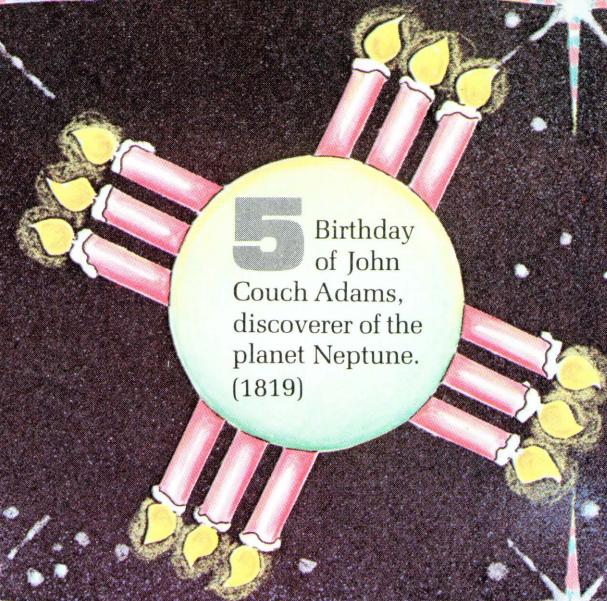
**2** Marconi  
patents the wireless  
telegraph. (1896)



**4** Gemini IV  
astronaut  
Ed White goes for a 20  
minute walk in space.  
(1965)



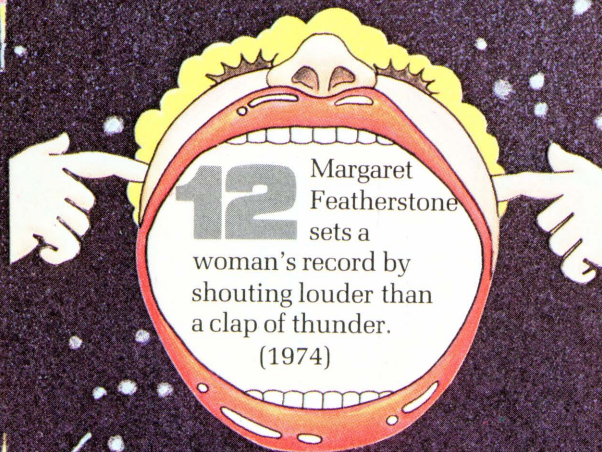
**5** Birthday  
of John  
Couch Adams,  
discoverer of the  
planet Neptune.  
(1819)



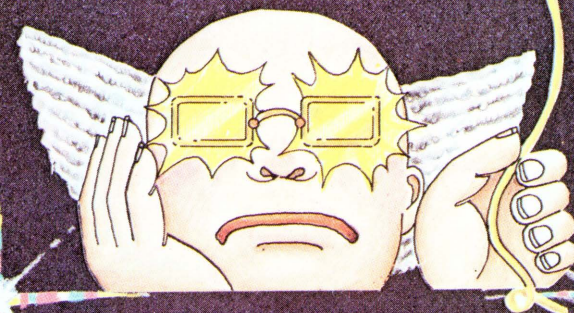
**6** The first drive-in  
movie theater opens  
in Camden, New Jersey.  
(1933)



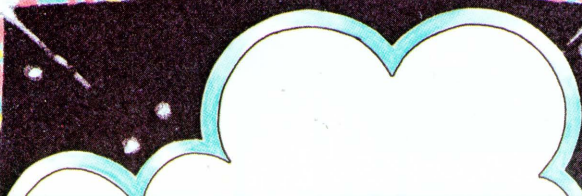
**12** Margaret  
Featherstone  
sets a  
woman's record by  
shouting louder than  
a clap of thunder.  
(1974)



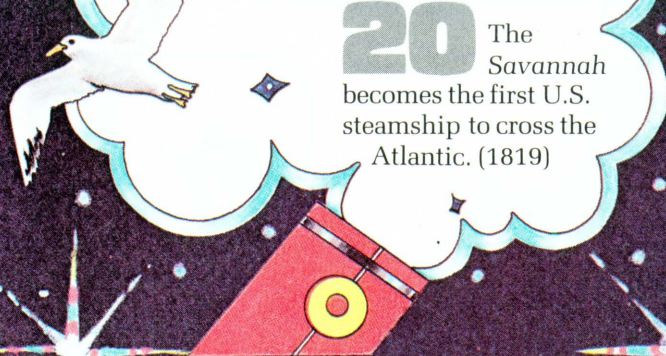
**15** Benjamin  
Franklin  
flies his kite and proves  
lightning is electricity.  
(1752)



**22** John Howe  
patents  
the pin manufacturing  
machine. (1832)



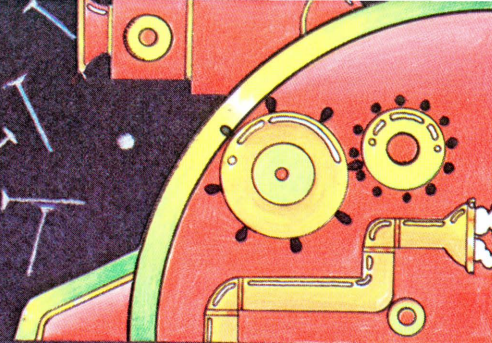




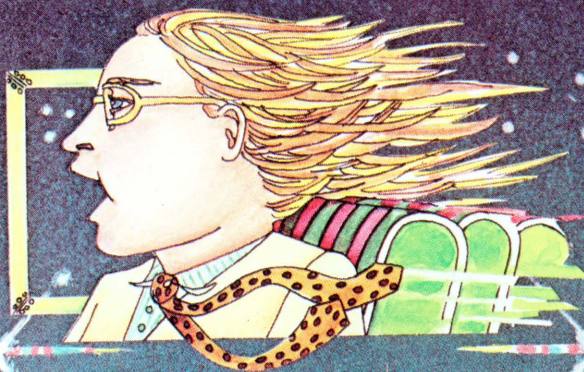
**20** The Savannah becomes the first U.S. steamship to cross the Atlantic. (1819)



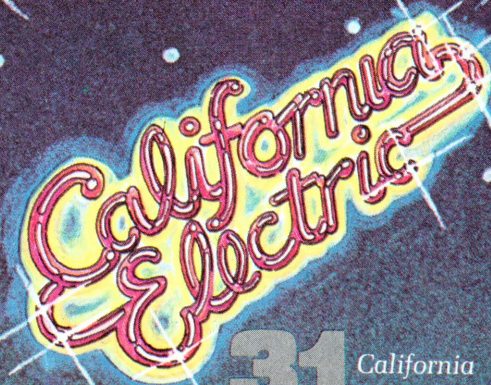
**21** Summer begins today.



**25** Horace Biren becomes the first airplane passenger to fly around the world in less than 100 hours. (1953)



**27** Television is introduced in the U.S. at a public demonstration in New York. (1929)



**31** California Electric, the first power company to sell electricity, is established. (1879)

S M T W T F S

Earth Days

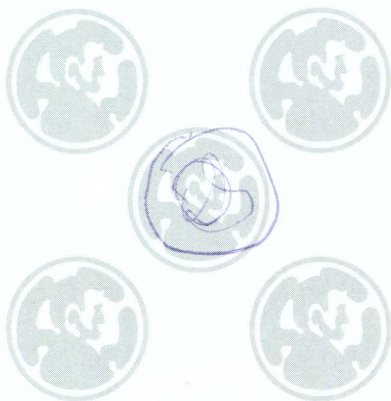
1	2	3	4	5	6	
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

June



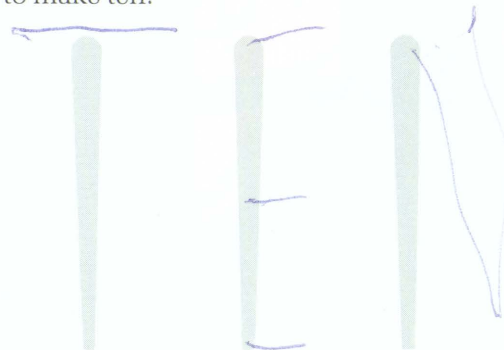
## Penny Puzzler

Arrange five pennies as you see here. Now, add just ONE more penny to get four cents in each row. It's not as hard as it seems.



## Toothpick Trick

Line up three toothpicks, as in the picture below. Now add six more to make ten.



## Star Puzzle

Some of what you need to know to do this cross-word can be found in this issue of 3-2-1 CONTACT. If you don't know the answer to a clue, look on the page listed after it.



### Across

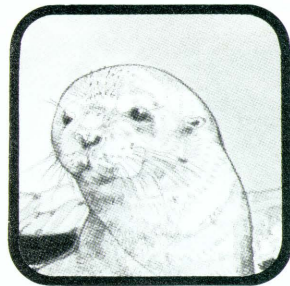
- 2 Another word for "insect"
- 5 He patented a pin machine:  
John \_\_\_\_\_ (p. 27)
- 7 It's the real center of a baseball  
(p. 7)
- 8 You cry when you feel this way
- 13 Frozen water
- 14 Not skinny

### Down

- 1 John \_\_\_\_\_,  
discoverer of Neptune (p. 26)
- 3 The Wildlife Park is one (p. 3)
- 4 Mork is from here
- 6 Santa's helper
- 7 It meows
- 9 It lives in the Galapagos:  
sea \_\_\_\_\_ (p. 31)
- 10 Female chicken
- 11 Not on
- 12 The sun is one (p. 39)

Answers on page 37.





# Pocket Zoo

## Animals of the Galapagos Islands

by Angela Caputo

This month your animals come from the Galapagos Islands in the Pacific Ocean. If you took a trip there, you would step into a very hot, dry place. The rocky ground is made of hardened lava that is millions of years old.

You wouldn't have to worry about running into any lions, tigers or bears. The islands are so far out in the ocean that large land mammals have no way of getting there. Instead, you would find many kinds of birds and reptiles that can't be found anywhere else on earth.

### How to Make Your Pocket Zoo

To make your animal cards, you need scissors, 4" x 6" index cards (or pieces of cardboard the same size) and some glue, paste or tape.

1. Cut out your six animal cards along the dotted lines.
2. Paste or tape the animal to one side of the index card. Do this so that the information about the animal *hangs over the side*. (picture below)
3. Now fold the flap with the information so that it is on the back of the card. Glue this side, too.
4. Use the extra space on the back for anything else you might want to write about each animal. Your pocket zoo is ready.







## Blue-footed Booby

**Category:** Bird

**Size:** 3 feet (1 m) long; it has a 5 foot (1.5 m) wingspan.

**Weight:** About 3 pounds (1.3 kg).

**Length of Life:** Up to 5 years.

**Home:** They make their nests on cliffs or in craters.

**Food:** Fish.

**Fact:** The booby is unafraid of people. Its feet are so blue, the color is reflected in its white breast feathers.

**Scientific Name:** *Sula nebouxi*



## Scarlet Crab

**Category:** Arthropod

**Size:** About one and a half feet (.5 m) wide, including legs.

**Weight:** 3 pounds (13.5 kg).

**Length of Life:** Up to 5 years.

**Home:** Burrows.

**Food:** Mini sea plants and animals, insects, small lizards.

**Fact:** The scarlet crab scrapes its food off rocks near the ocean. When a giant wave comes in, the crab flattens its body to the rock and hangs on with its claws. When the wave rolls back, it goes on eating as if nothing had happened.

**Scientific Name:** *Graspus graspus*



## Yapok (yah-POCK)

**Category:** Marsupial

**Size:** A little over 1 foot (.3 m) long.

**Weight:** 10 to 15 pounds (4.5–6.8 kg).

**Length of Life:** About 8 years.

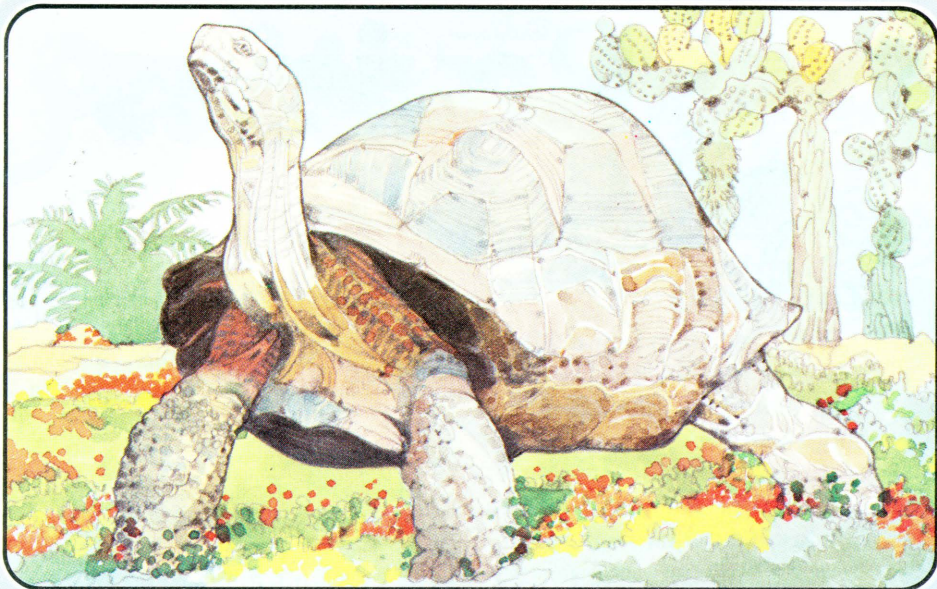
**Home:** The sea shore.

**Food:** Shellfish, fish eggs.

**Fact:** The yapok is also known as the water opossum. Females can carry their young underwater. They are sealed in their mothers' pouches with a small supply of air for them to breathe.

**Scientific Name:** *Chironectes minimus*





## Giant Tortoise

(TOR-tuss)

**Category:** Reptile

**Size:** Up to 4 feet (1.2 m) long.

**Weight:** About 500 pounds (230 kg).

**Length of Life:** 150 years.

**Home:** Low areas of the islands.

**Food:** Plants and grasses; fallen fruits, such as crab apples.

**Fact:** This reptile is believed to live longer than any other animal. It is also one of the largest tortoises. You could easily ride on its back, although the ride would be a bumpy one!

**Scientific Name:** *Testudo elephantopus*



## Sea Lion

**Category:** Marine mammal

**Size:** Up to 7 feet (2 m) long.

**Weight:** About 600 pounds (270 kg).

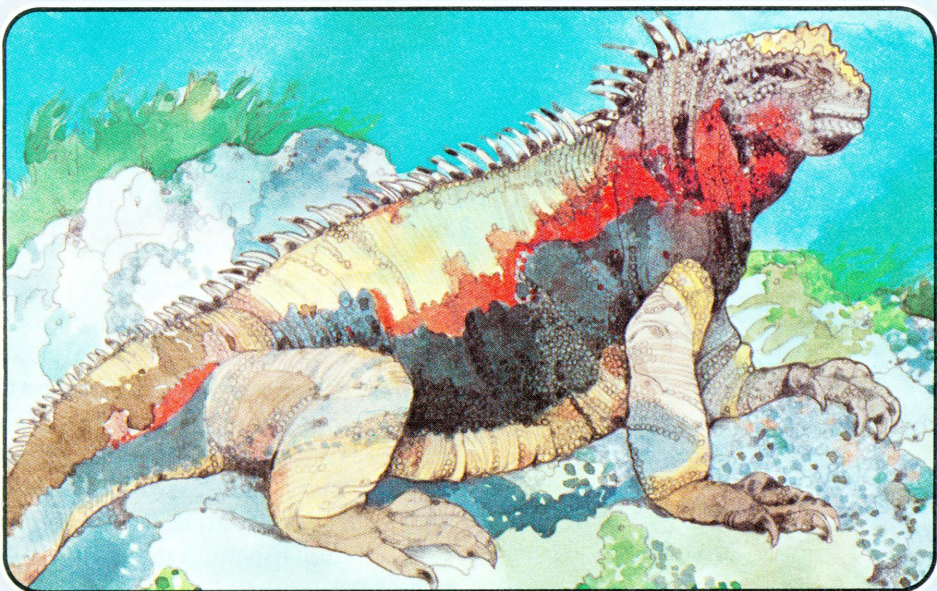
**Length of Life:** Up to 23 years in captivity.

**Home:** The rocky shore.

**Food:** Octopus, squid, herring and other fish.

**Fact:** The sea lion is very friendly and can be very playful, too. People have seen these animals ride waves to shore, almost as if they were surfing.

**Scientific Name:** *Zalophus californianus*



## Marine Iguana

(ih-GWAN-uh)

**Category:** Reptile

**Size:** Up to 4 feet (1.2 m) long.

**Weight:** About 8 pounds (3.6 kg).

**Length of Life:** Unknown.

**Home:** At the sea shore.

**Food:** Seaweed.

**Fact:** Every year, male marine iguanas compete for land where they can mate with females. Sometimes they fight. They butt heads, as goats do. The scales on their heads protect them from getting badly hurt.

**Scientific Name:** *Amblyrhynchus cristatus*



Here are some books to read and things to do and see, after you finish this issue of 3-2-1 CONTACT.



## It's Magic!

This review was sent in by Aaron Knopf of Creve Coeur, MO.

The Magic House is in Kirkwood, Missouri. It's a great museum. They have a static electricity ball that makes your hair fly up. You can even match wits with a computer! There's lots more to do, but see for yourself. Take a trip to the Magic House Museum and have some fun!

Did you go to a museum lately? If you would like other kids to know about it, write a 100-word review for CONTACT. If we use it, you'll get a T-shirt. Send the review with your name, address and T-shirt size to:

**Museum Review**  
3-2-1 CONTACT  
P.O. Box 599  
Ridgefield, NJ 07657

## Zoo News

On page 14 you found out what's new at the San Diego Zoo. Would you like to find out about some other zoos and their animals? The library has lots of books on the subject. Here are a few to check out:

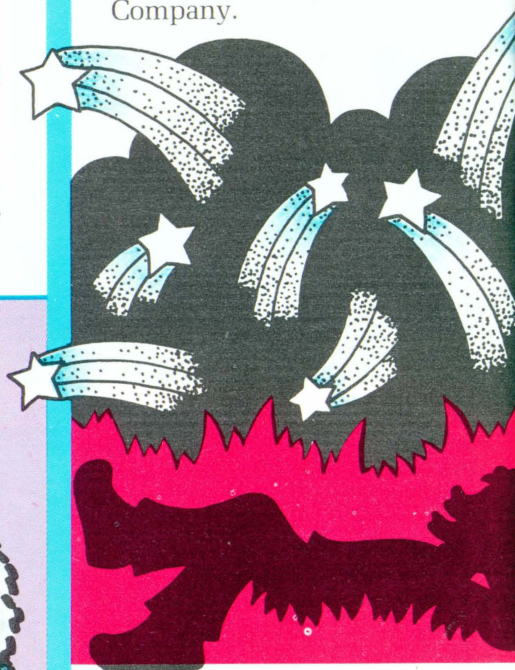
**Zoo Careers** How would you like to work at a zoo someday? William Bridges will introduce you to some of the people who already do. You'll find out what they do each day. You'll also discover the kind of training they need for their jobs. The book is published by William Morrow & Company.

**Zoos in the Making** How do animals you see in the zoo get there? Some are really huge, and they come from all over the world. Dorothy Shuttlesworth will tell you this and more. Her book is published by E.P. Dutton.



**City of Birds and Beasts** This book shows you a typical day in the lives of people who work at New York's Bronx Zoo. You'll meet George, who prepares the animals' food, Emil, who is the zoo vet, Howie, who takes care of the apes, and many others. This book by Jack Denton Scott is published by G.P. Putnam's Sons.

**Behind the Scenes at the Zoo** There's a lot going on at the zoo that visitors never see. For the people at the zoo there's cleaning to do, repairs to be made and food to prepare. This story of zoo life is by David Paige. It's published by Albert Whitman & Company.



## Attention Skywatchers!

There is one group of stars that your star wheel won't help you find—shooting stars. These "stars" are really bits of meteors that burn up in the earth's atmosphere. A great time to see



# Previews

shooting stars is on the night of August 12. But you don't have to wait that long. You can see them any clear night—if you're patient and lucky!



## Mystery Island Contest

In *Any Questions?* we told you what held islands up. Now we want you to find one special island. If you do, you might win a 3-2-1 CONTACT T-shirt. So get out those world maps. Here are some clues to help you.

1. It is in the Atlantic Ocean.
  2. It's warm here all year long.
  3. It is closer to North America than it is to Europe.
  4. It is more than 500 miles from any other land.
  5. It is closer to North Carolina than to any other state in the U.S.
- Send your guess, along with your name, address and T-shirt size to:

**3-2-1 CONTEST: Mystery Island**  
**3-2-1 CONTACT**  
 P.O. Box 599  
 Ridgefield, NJ 07657

The first five letters we pick with the right answer are the winners.

## Wind Scale

Windmills aren't the only things that the wind blows. You can estimate the wind's speed by watching how it affects things around you. Use this chart as a guide.

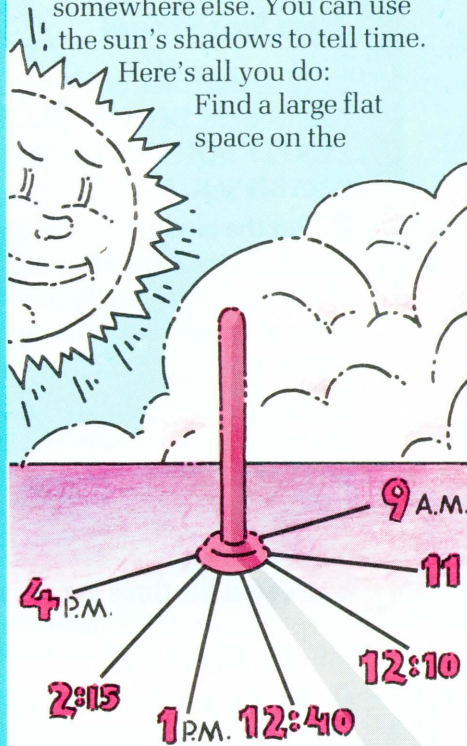
Wind Speed (miles/hour)	What Happens
1 to 3	chimney smoke shows wind direction
4 to 7	leaves rustle lightly
8 to 12	paper, leaves blow along the ground
13 to 18	paper, leaves blow through the air
19 to 24	small trees sway; flags stand out straight on poles
25 to 31	flags flap; hats blow off; umbrellas are hard to use
32 to 38	small trees bend; hard to walk
39 to 46	twigs snap off trees
47 to 73	large trees blow down; buildings damaged
over 74	Take cover! Hurricane!

## Shadow Clock

In *Any Questions?* you learned that time changes as the sun moves across the sky. But did you know that, as the sun moves, shadows of things like trees and poles move, too? At 1:00 P.M. they are at one spot. By 2:00 P.M. they have moved somewhere else. You can use the sun's shadows to tell time.

Here's all you do:

Find a large flat space on the



ground that is in sunlight all day. Lay a big piece of paper on top of it. Stick a straight object one or two feet high in the middle of your paper. That's to make the shadow.

Each hour, from about 9:00 A.M. till 3:00 P.M., mark the position of the object's shadow on the surface. You'll need a watch. Write the time next to each mark.

When you're done you'll have a clock that tells time by the position of the sun. Try out your new clock the next day. It works!



# STARWHEEL

(continued from page 21)

## A Map of the Stars

### How to Put Together Your Star Wheel

**1.** Glue the black circle to the cardboard circle. **DO NOT GLUE THE PURPLE SQUARE TO THE CARDBOARD SQUARE.**

**2.** Put the circle on top of the cardboard square. Move it until the curves of the circle just barely touch all four sides of the square. To keep it in place, attach it with paper clips.

**3.** Find the blue dot in the center of the circle. Use scissors or a pencil to poke a hole through the center.

**4.** Put a paper fastener through the hole and fasten it. Remove the paper clips.

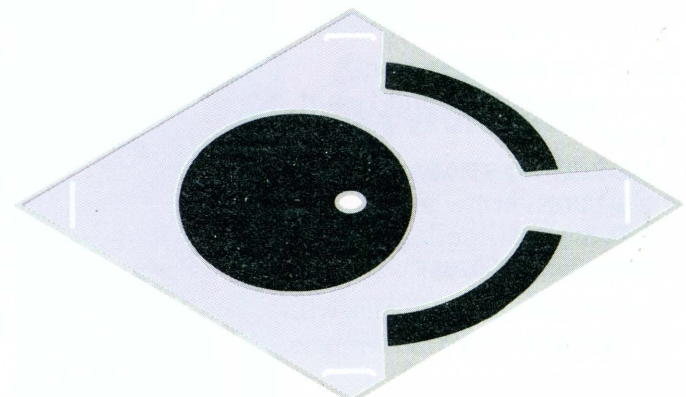
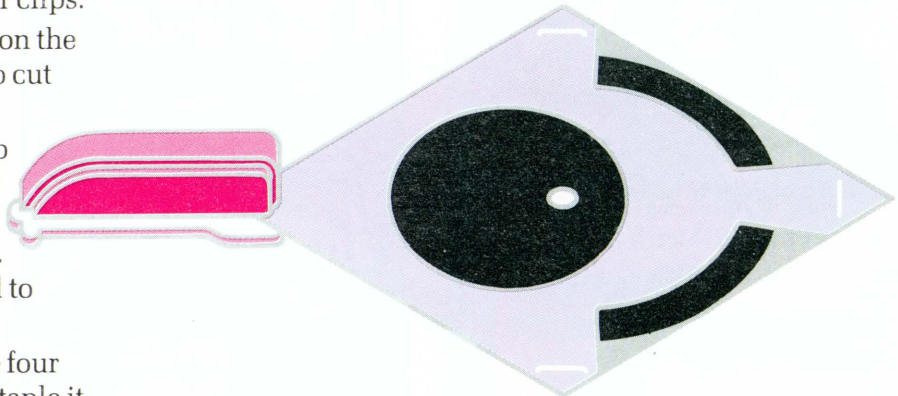
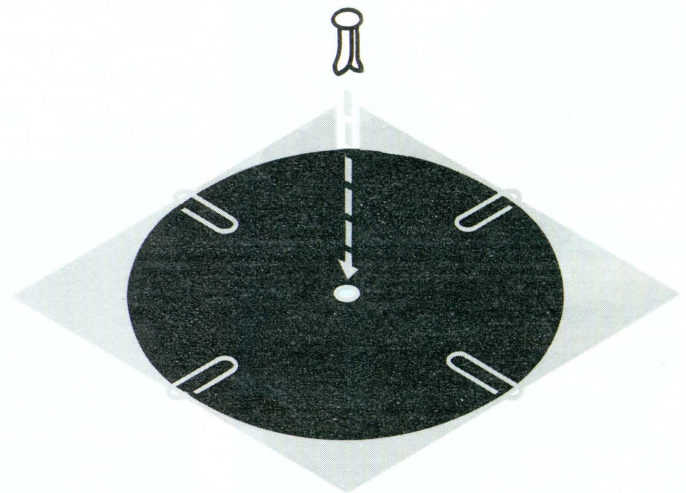
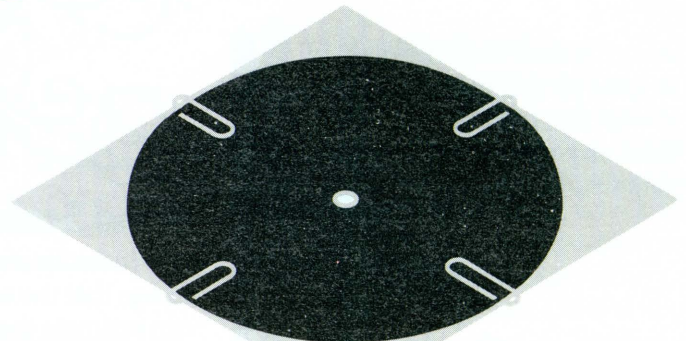
**5.** Cut out the three gray areas on the purple square. Be careful not to cut into the purple area.

**6.** Put the purple square on top of the circle. Its corners should line up with the corners of the cardboard square. Don't worry. The purple square is supposed to cover up some of the stars.

**7.** Find the staple marks at the four corners of the purple square. Staple it to the cardboard square.

**8.** Turn the circle to make sure it turns freely.

**9.** Now you're ready to use your star wheel.







(To keep your directions handy, you may want to cut them out and put them on the back of your star wheel.)

### Using Your Star Wheel

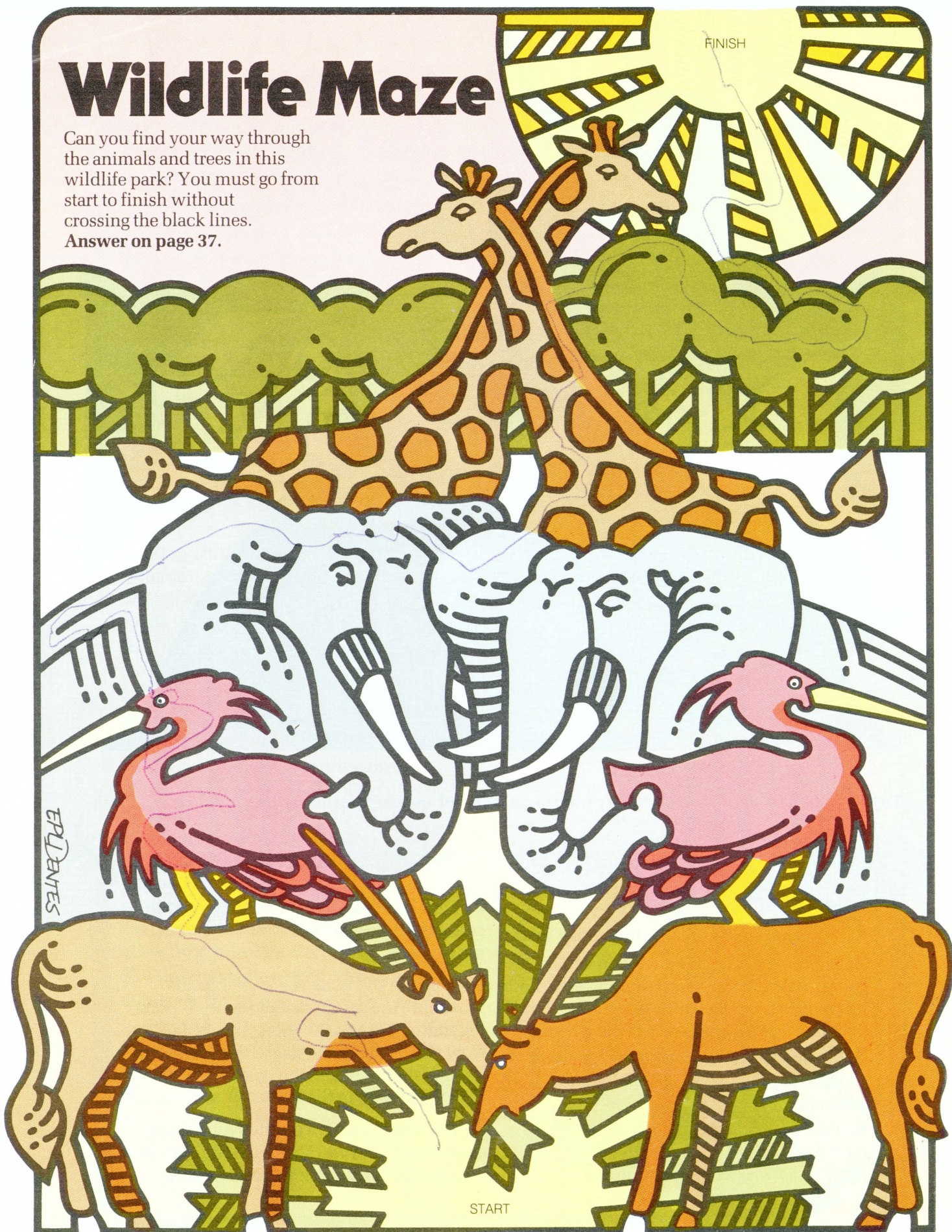
- 1.** Turn the circle until you find today's date.
- 2.** Choose the hour tonight when you're going to use the star wheel. Subtract one hour if your area uses Daylight Saving Time. Find that time on the purple part of the wheel.
- 3.** Line up today's date with the hour you chose. Use a paper clip to hold the star wheel in that position.
- 4.** Take a flashlight and go outside with your star wheel on a clear night. Your family may want to join the fun.
- 5.** Find south. If you face west, where the sun sets, south is on your left. Now, stand facing south.
- 6.** Hold the star wheel over your head. Make sure the corner marked south is pointing south. Use a flashlight if you need it. Now you can read the star wheel like a map. Its stars should match the position of the stars you see up in the sky.
- 7.** The Big Dipper is a constellation that is easy to find. Can you spot it tonight? See how many other constellations you can find.



# Wildlife Maze

Can you find your way through the animals and trees in this wildlife park? You must go from start to finish without crossing the black lines.

Answer on page 37.





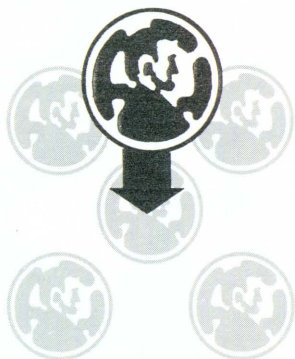
# Did It!

## Answers

**Toothpick Trick** (page 28)

**Wildlife Maze** (page 36)

**Penny Puzzler** (page 28)  
Place a penny ON TOP of the middle one.



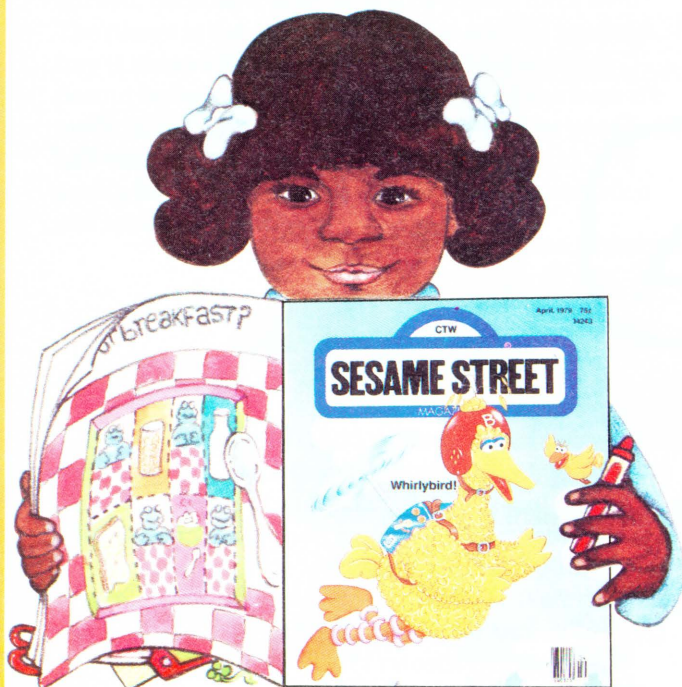
**Crossword Puzzle** (page 28)





# Enjoy Sesame Street

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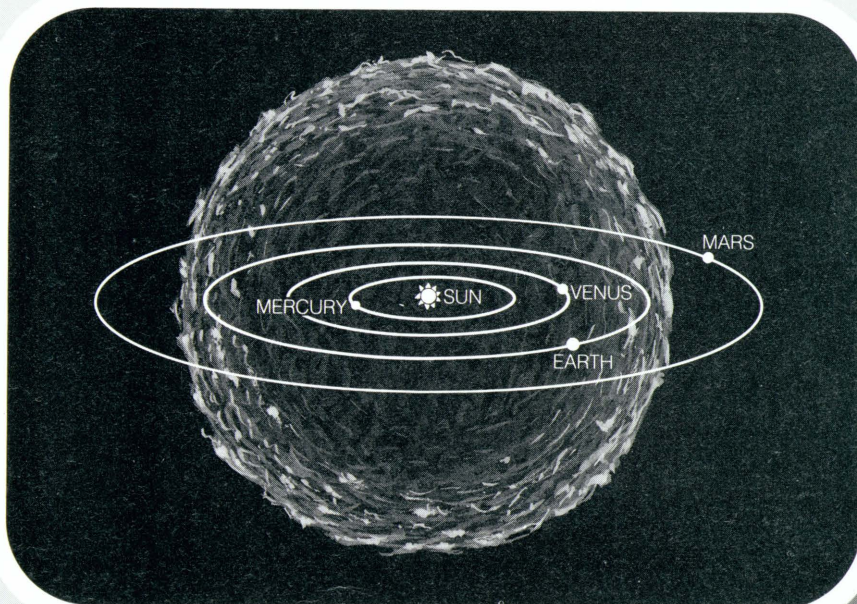
## Skyfacts: Stars

Each month CONTACT will bring you another SKYWATCH. Clip these pages and save them in a notebook. Soon, you will have your own guide to outer space.

## Skywatch

-  Stars are formed when particles of dust and gas are pulled together by gravity. As they are pressed tighter, they get hotter and hotter. When pressure and heat are great enough, nuclear reactions begin inside the newborn star. It begins to send out energy. At this point a star looks very much like our sun.
-  Stars like the sun use hydrogen gas for fuel. But after billions of years, the fuel is used up. When this happens, a star starts getting larger and larger. Because of its red color and huge size, it is called a *red giant*.
-  When a red giant can grow no larger, it collapses. As it does, there is an explosion, called a *nova*. Extra large stars cause even bigger explosions known as *supernovas*.
-  After a nova, all that is left is a *white dwarf*. This is a small, tightly packed star. Supernovas make even smaller, denser stars, called *neutron stars*. Someday these may turn into black holes.
-  It takes a star a very long time to burn out. The sun, for example, is already five billion years old. It will burn for at least another five billion years.
-  On a clear night you can see about 3,000 stars without a telescope.
-  The star Sirius is the brightest star in the night sky. Up close, it gives off 26 times as much light as our sun.
-  Stars can be red, yellow or bluish white. It depends on their temperature. Coolest stars are red and hottest ones are bluish white. Yellow stars like our sun are average.
-  White dwarfs are small dense stars. The material in them is packed closely together. A piece of a white dwarf star the size of a sugar cube weighs hundreds of pounds.
-  Stars are so far away that scientists had to invent new measurements to cover large space distances. One of them is the *light year*. Light travels at the speed of light—186,000 miles *each second*. A light year is the distance light travels in one year.
-  Compared to most stars, Alpha Centauri is pretty close to earth. But it's still so far away that it takes light from there 4.3 years to reach earth. So, Alpha Centauri is 4.3 light years away. That's a lot easier than saying 25,000,000,000,000, miles!
-  Because it is so much closer than most stars, Alpha Centauri is the third brightest star in the night sky.

**A 200-million-mile-wide red giant star compared to our solar system. It is big enough to hold the Sun, plus the orbits of Mercury, Venus and Earth inside it!**





Stars begin as giant clouds of dust and gas.

## Focus on Stars

When you think of a star, you probably imagine a tiny spot of light in the night sky. But up close, many of these stars would look bigger and brighter than our sun. The North Star, for example, is really 25 times brighter than the sun.

All stars are balls of hot, glowing gases. They are made mostly of hydrogen gas. Nuclear reactions inside stars turn the hydrogen fuel into

helium gas and energy. In the case of the sun, that energy produces the heat and light that make life on earth possible.

The sun, our nearest star, is 93 million miles away. That sounds like a big distance. But in outer space, that's practically next door. The next closest star to earth is called Alpha Centauri. It is 25 million million miles away. No wonder the stars seem so small. They are so far away, it's surprising we can see them at all!

*(continued on page 39)*